7

63d Congress, 2d Session. | HOUSE OF REPRESENTATIVES. | Document No. 707.

CUYAHOGA RIVER, OHIO.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

ITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT ON SURVEY OF CUYAHOGA RIVER, OHIO, FROM ITS MOUTH TO A MORE SOUTHERLY CONNECTION WITH THE OHIO CANAL, WITH A VIEW TO ELIMINATING BENDS AND SECURING A NAVIGABLE DEPTH OF TWENTY-ONE FEET, WITH SUITABLE WIDTH, TOGETHER WITH A REPORT ON ANY PROPOSITION FOR COOPERATION BY LOCALITIES AFFECTED THEREBY.

EBRUARY 4, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustrations.

War Department,
Washington, February 4, 1914.

he Speaker of the House of Representatives.

Sir: I have the honor to transmit herewith a letter from the cting Chief of Engineers, United States Army, of this date, together ith copy of report from Col. John Millis, Corps of Engineers, dated ine 29, 1912, with maps, on survey and estimate of cost of improving e Cuyahoga River, Ohio, made by him in compliance with the ovisions of the river and harbor act approved February 27, 1911.

Very respectfully,

Lindley M. Garrison,
Secretary of War.

War Department,
Office of the Chief of Engineers,
Washington, February 4, 1914.

From: The Chief of Engineers, United States Army.
To: The Secretary of War.
Subject: Survey and estimate of cost of improving Cuyahoga River, Ohio.

1. There is submitted herewith, for transmission to Congress, report dated June 29, 1912, with maps, by Col. John Millis, Corps of Engineers, rendered pursuant to the following item contained in the river and harbor act approved February 27, 1911:

> Survey and estimate of the cost of improving the Cuyahoga River, Ohio, from its mouth to a more southerly connection with the Ohio Canal, with a view to eliminating bends and securing a navigable depth of twenty-one feet, with suitable width; and the said survey and estimate shall include a report on any proposition for cooperation by localities affected thereby.

It is to be noted that the above item superseded an order for preliminary examination of this locality included in the river and harbor act approved June 25, 1910.

2. The Cuyahoga River is a tributary of Lake Erie, into which it empties at the city of Cleveland, Ohio. At this port the United States has provided an outer harbor suitable for the deepest draft lake vessels. The existing project provides for carrying the channel to a point about 300 feet above the bridge near the mouth to connect with the channel maintained by the city of Cleveland. With the exception of the above, no improvement of Cuyahoga River has been undertaken or contemplated by the United States. The district officer states that the difficulties of navigation which it is desired to remedy arise mainly from the narrowness and crookedness of the present channel of the lower river and its deficient depths. There is also a demand for extension of the channel farther upstream to give vessels access to exceptionally advantageous but at present undeveloped sites for manufacturing establishments, and a desire for correction of existing undesirable flood conditions.

3. Several plans of improvement are considered by the district officer. Plan No. 1, which he prefers, contemplates a channel having a navigable depth of 21 feet, 300 feet wide up to a point near the new Baltimore & Ohio lift bridge; thence a cut 250 feet wide across the neck to a point between the lower and middle bridges of the Cleveland, Cincinnati, Chicago & St. Louis Railway Co., and another cut in continuation of this across the next neck or bend, meeting the river opposite the Cincinnati slip. The estimated cost of this plan is $3,100,000. At the time of the submission of the district officer's report no offers of cooperation had been received. He expresses the opinion that the improvement substantially as outlined under plan No. 1 is worthy of being undertaken to provide for and insure the development of the harbor and city of Cleveland to the fullest extent practicable and to utilize to the highest degree the natural advantages and the commercial and industrial possibilities of the locality, but he makes no recommendation regarding the proportion of the cost that should be borne by the United States. The division engineer is of opinion that the improvement should not be undertaken by the General Government unless the city of Cleveland provides the right

of way, rebuilds the bridges, and bulkheads the property to be improved.

4. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated January 28, 1914, from which the following is quoted:

> It is the judgment of the board that all of the plans presented with the report are faulty in that none provide for a really unobstructed waterway, free from dangerous bends and with sufficient headroom under the bridges. The board believes that further study is required. It appears that the city of Cleveland is somewhat embarrassed in its consideration of this matter in dealing with property interests affected by not knowing what the attitude of the Government will be, and it is claimed that if the policy of the United States regarding the extent to which it would be disposed to cooperate in this work were made known it would greatly assist the city of Cleveland in arriving at a definite plan.
>
> As general commerce and navigation would be benefited by the proposed improvement, the board believes that the United States would be justified in participating in the work. It seems clear that, inasmuch as the city of Cleveland will reap the principal benefits, it should bear at least those portions of the cost that the local interests are usually required to contribute, namely, the necessary reconstruction of bridges, the provision of right of way, and the bulkheading required for the protection of property abutting on the channel. As these constitute such a large portion of the total cost in this case, it is believed that the United States should assume the entire cost of dredging, which is the only part of the work ordinarily undertaken by the Federal Government.
>
> The board therefore recommends the tentative adoption of a general plan of improvement along the lines suggested herein, work to be begun under the conditions outlined above when the city of Cleveland shall have presented a completed plan satisfactory to the Secretary of War. In order that the department may cooperate in the preparation of the plan to be finally adopted it is recommended that an appropriation of $5,000 be made for this purpose.

5. After due consideration of the above-mentioned reports I concur in general with the views of the division engineer and the Board of Engineers for Rivers and Harbors that the improvement by the United States of Cuyahoga River, Ohio, is deemed advisable under a tentative plan in which the United States shall assume the cost of he dredging only; the cost of the remainder of the improvement, ncluding the necessary reconstruction of bridges, the provision of ight of way, and the bulkheading required for the protection of roperty abutting on the channel, to be borne by local interests and he work to be begun under the conditions outlined when the city of leveland shall have presented a completed plan satisfactory to the ecretary of War. An appropriation of $5,000 is recommended to nable the department to cooperate with the city of Cleveland in the reparation of a suitable plan. The amount that will be required for he work to be done by the United States can not be definitely known ntil the completed plan has been formulated, but present informaon indicates that it will probably not exceed $400,000 and may be nsiderably less. If the tentative project herein recommended be dopted by Congress, an estimate for the work to be done by the nited States will be included in the Annual Report of the Chief of ngineers when the exact amount required has been determined.

Edw. Burr,
Colonel, Corps of Engineers,
Acting Chief of Engineers.

REPORT OF BOARD OF ENGINEERS FOR RIVERS AND HARBORS.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
January 28, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. This is a report of survey and estimate of the cost of improving the Cuyahoga River, Ohio, from its mouth to a more southerly connection with the Ohio Canal, with a view to eliminating bends and securing a navigable depth of 21 feet, with suitable width; and the said survey and estimate shall include a report on any proposition for cooperation by localities affected thereby, called for by the act of February 27, 1911.

2. The area drained by this river is about 830 square miles and the monthly mean discharge varies from about 389 cubic feet per second to about 4,180 cubic feet per second. Except at and for a distance of about 300 feet inside the entrance no work has been done or authorized on the Cuyahoga River by the United States. The portion of river heretofore considered in connection with commercial navigation is from the mouth to a point just above Clark Avenue, a distance of about 5½ miles. This section and old river, a dead end near the mouth, have been under improvement by the city of Cleveland for many years. Dock lines varying from 130 feet to 270 feet apart have been laid out, dredging to a depth of about 20 feet has been carried on as required, and the banks have been generally bulkheaded.

3. The difficulties of navigation that it is desired to remedy arise mainly from the narrowness and crookedness of the channel and the deficient depths. Additional facilities for turning are also desired, and there is a demand for extending the channel farther upstream to permit of additional industrial and commercial development.

4. The Ohio Canal connects with the Cuyahoga River in Cleveland near Dille Avenue by means of the Weigh Lock, having a lift of 14 feet. The dimensions of this canal limit the size of vessels using it to 90 feet in length by 15 feet in width and a draft of 4 feet.

5. The district officer outlines a plan for an inner harbor to meet present and prospective needs involving a commodious main avenue or highway, lateral or auxiliary channels, turning facilities, and rail connections. He states that the execution of such a plan will involve many difficulties and require a great deal of time, but that any plan adopted should be so devised as to permit of progressive development, doing first what is most urgent and then taking up the other parts in the order of their need.

6. In regard to the expression "more southerly connection" used in the act, the district officer states that this is assumed to be a point to which a 21-foot channel can be carried without resort to locks. In determining the dimensions to be given the improved channel consideration has been given to the needs of the largest coal and ore vessels.

7. The following outline of the improvements proposed to correct the difficulties now experienced is given: Beginning near the mouth, a channel 300 feet wide to near the Baltimore & Ohio lift bridge is proposed. Between the Baltimore & Ohio lift bridge and the central viaduct two plans are considered. Plan No. 1 provides for a cut

250 feet minimum width between the lower and middle bridges of the Cleveland, Cincinnati, Chicago & St. Louis Railway Co. and another cut in continuation of this across the next neck or bend above, eliminating Irishtown and Collision bends. A modification or readjustment of bridges will be required.

8. Plan No. 2 follows the present river to the neck just south of the Upson Nut Co.'s works, widening where necessary to 200 feet and cutting a channel through the neck 225 feet wide. Above the central viaduct one plan only is considered, involving some modification of the dock line near Mahoning Avenue and making a cut along this avenue 200 feet wide across a neck, coming to the river again a short distance below the Erie Railroad bridge, above which the natural river is followed to the Cleveland Furnace Co.'s plant. The Mahoning Avenue cut is less urgent than the work below and can be deferred until there is a greater development of industries above. An estimate has been prepared by the city authorities of the cost of widening the river and easing the bends so as to improve conditions without eliminating bends. The total cost of this plan (No. 3) is about $4,500,000. The district officer prefers plan No. 1 and is doubtful if plan No. 2 is worth undertaking. Plan No. 3, following the present river, does not seem worth undertaking as a whole, but it would be advantageous to improve conditions here and there, since such work would be of benefit should the rectification of the channel be undertaken later. Clark Avenue Bridge, 5½ miles above the river mouth, was formerly considered the head of navigation, but improvements being made by interested property owners and the city will extend this channel 1.6 miles further to the Denison Harvard Viaduct.

9. Since 1901 the city has expended annually about $46,000 in dredging the river, and future maintenance of an enlarged and improved channel will be work of a somewhat similar character, being the removal of material brought down the river, and is estimated to cost not over $75,000 annually. No propositions for cooperation in the proposed improvement by the localities affected had been received when the report of the district officer was submitted, but he states that the estimates have been furnished interested parties, and any offers of cooperation will be forwarded with recommendations relative to the advisability of participation in the proposed improvement by the Federal Government. The district officer states that to what extent if any the United States should participate in the proposed improvement is almost entirely a question of policy which can only be determined by the lawmaking authority.

10. The district officer expresses the opinion that the improvement substantially as outlined under plan No. 1 is worthy of being undertaken; that if it is not found practicable to undertake plan No. 1, improvement work in the way of widening, easing bends, improving navigation conditions at the bridges, etc., should be confined to the river in its present location up to the present limits of navigation at the Cleveland Furnace Co.'s works.

11. Estimates include real estate required, clearing right of way, excavation, bulkheads, and bridges, and are summarized as follows:

Plan No. 1	$3, 100, 000
Plan No. 2	3, 300, 000
Mahoning Cut	1, 700, 000

An approximate estimate of the cost of the work between the Clark Avenue Bridge and the Denison Harvard Bridge now being carried on by interested parties is $1,000,000.

12. The division engineer states that through freight, such as ore, coal, and package freight, which constitutes a large part of the commerce of Cleveland, is principally handled in the outer harbor and on the river below Superior Street, while certain building materials, also large items in the commerce of the port, are carried in relatively small vessels which can navigate the river without further improvement; that the proposed straightening of the river is for the purpose of developing certain land as manufacturing sites, which improvement, in his opinion, should be made by local authorities rather than by the United States. He refers to precedents where such work has been done by the General Government, but calls attention to the fact that in such cases the United States has not purchased the land required nor changed the existing bridges, and he recommends that the improvement of the Cuyahoga River be not undertaken by the General Government unless the city of Cleveland provides the right of way, rebuilds the bridges, and bulkheads the property to be improved.

13. Since the district officer's report of survey was submitted the board has received a printed copy of a report by the special committee of the council of the city of Cleveland appointed to investigate and report on the improvement of the lower Cuyahoga River, forwarded by the mayor, Hon. Newton D. Baker, in which, after describing the physical and commercial conditions and the benefits which would result from the improvement of this stream, the conclusion is reached that the city of Cleveland would be justified in paying 50 per cent of the cost of the work required below the Cincinnati Slip, in accordance with plan No. 1. The cost of this work, as estimated by the district officer, is $3,100,000. Of this amount $186,161 is for excavation, $410,500 for bulkheads, and all the balance for right of way and bridges.

14. In its consideration of this subject the board visited the locality, made an inspection of the Cuyahoga River and Cleveland Harbor, and held a public hearing in the city of Cleveland on October 29, 1913. The clear height under the new Superior Avenue Viaduct, now under construction, is to be 93 feet over the present channel and 83 feet over the cut by route No. 1. As a result of the discussion on this subject at the hearing, two alternative plans in the vicinity of the Superior Bridge have been considered. Both involve a new location of the cut under the bridge so as to enter the present channel under the main span, where the bridge has the greatest clearance. No estimate of cost of either plan is available. The district officer has given further consideration to this subject and submitted a report to the board under date of December 4, 1913, in which he expresses the opinion that under all the circumstances the original plan of route No. 1 is the only practicable plan which the city can hope to inaugurate and to carry out.

15. At the request of those interested a further hearing on this subject was given at the office of the board on January 27, 1914, at which appeared Hon. Theodore E. Burton, United States Senator; Hon. Robert J. Bulkley, M. C.; Hon. Newton D. Baker, mayor; and Mr. Robert Hoffman, city engineer. At this hearing the opinion was

expressed by those interested in the project that a plan on the lines last presented, with the straighter channel lines and more direct access to the high channel span of the new Superior Viaduct, is that required to meet the needs of Cleveland's commerce, even at the increased cost, and also that a headroom of 93 feet is necessary under any fixed bridges crossing the improved channel. The opinion was strongly expressed to the board that, in view of the large expenditures to be required of Cleveland and the necessity for the people of Cleveland to understand the question fully, it would be very desirable that some expression be given by Congress of its willingness to cooperate and of the extent to which such cooperation might be expected.

16. It is clear from a study of this subject that it is a complex one, involving unusual considerations. Certain objectionable features appear in all plans thus far considered, and this will probably be the case to some extent in any project that may be proposed.

17. Plan No. 2 would necessitate numerous changes in rail and industrial conditions, involving great cost and a serious disarrangement of the movement of freight in an established industrial center. Plan No. 1 would pass under the Superior Viaduct, where the proposed clear height is inadequate for the passage of the largest vessels, for the accommodation of which the work is desired. One of the suggested alternative plans for passing under the bridge would involve extra cost and sharper bends, which would be objectionable from a navigation standpoint and also on account of its affording a less free flow for the water in time of flood, which is a matter of considerable importance. The other alternative plan is the best from engineering and navigation standpoints, but involves a marked increase of cost, especially for right of way. Any material changes in the Superior Bridge would be objected to by a large number of citizens as indicated by a communication from the Cleveland Chamber of Industry dated November 5, 1913, copy herewith, and as further emphasized at the hearing of January 27, 1914.

18. Owing to the many complications involved and the impracticability of adopting a definite and final plan at this time which would not be subject to change, necessitated by either economic or engineering considerations, it is believed that the plans now before the board must be considered as tentative only, and that considerable time must elapse before a final plan, acceptable to all interests concerned, with accurate estimates of cost, can be adopted.

19. The situation in which Cleveland finds herself is one not uncommon for cities which have had a rapid growth for which adequate provision has not been made in the city planning.

20. Doubtless the harbor afforded by the Cuyahoga River was the immediate cause of the settlement which has developed into the city of Cleveland. The south shore of Lake Erie at Cleveland forms a level plateau, with its surface from 80 to 100 feet above the lake level. Through this plateau passes the valley of the Cuyahoga, a flat plain, which within the city limits has a width varying from 3,000 to 5,500 feet, with irregular outlines and abrupt slopes to the surface of the plateau. The river follows a crooked course through this val- ey, confined by bulkheads to a width of from 130 to 300 feet. Dur- ng freshets the valley floor above Detroit Avenue is subject to submergence.

21. The greater part of the city is built on the plateau. The lowlands of the valley have been utilized for manufacturing sites and railroad yards, and both banks of the river are in active commercial use nearly up to Clark Avenue Bridge, the old head of navigation.

22. The lake front is protected by a breakwater parallel to the shore, forming a sheltered harbor. The narrow strip of beach between the plateau and the lake is largely occupied by railways and their yards. Outside of the railway right of way the shallow water on the edge of the lake is being filled. Some piers have been constructed and more are projected. Title to much of the shore front is in litigation, arresting temporarily a full commercial development.

23. Cleveland is a manufacturing and a shipping center, and also a point of transshipment between the lake carriers and the railways. Provision for its commerce must then be made under three general categories. Its package freight and passenger service must have commodious piers not distant from the hotels, business center, and the railway stations. Access to such piers must be had over well-paved streets, free from railroad grade crossings.

24. For bulk freight transshipped between water carriers and the railways terminals must be provided in which the piers contain railway tracks and mechanical unloaders and lead from commodious yards, where the trains can be made up or broken. These piers and yards must be free from ordinary vehicular traffic and from grade crossings with such traffic.

25. For manufactories dependent in part on water transportation for the receipt of raw materials and for the distribution of products, large areas of land are required, located on a navigable channel and connected with the railways. Unless such manufacturing establishments are located on comparatively cheap land, the overhead charges resulting from the interest on the capital invested in the land form a heavy burden.

26. The location of Cleveland affords excellent facilities for provision for each of these classes of commerce. On the lake front can be placed the passenger and package freight terminals. Space exists there also for terminals for the interchange of freight between cars and boats. The Cuyahoga River offers good facilities for factory sites.

27. Unfortunately, city growth was faster than city planning. The manufacturing establishments were built closely in the valley on both sides of the crooked stream, intermingled with railway yards and tracks, each placed as most convenient at the time of construction and without much regard for the future. Costly bridges were built not only over the stream but also spanning the valley, with openings for boat traffic conforming to conditions then existing. No provision was made for straightening the crooked waterway, either with a view to decreasing the dangers of navigation or with the intent of lessening the periodical overflow of the lands toward the head of the valley, long deemed of little value.

28. To-day Cleveland finds the old navigable part of the Cuyahoga outgrown. Not only have accidents to vessels become so numerous that one of the reaches of the river is known as "Collision Bend," but also under the stress of the need of diminishing the cost of freight carriage by water, the lake vessels are becoming too large to be able to navigate the crooked waterway. In addition, the formerly de-

spised lowlands toward the head of the valley are urgently required for factory sites.

29. These demands make the straightening of the Cuyahoga a necessity. As an engineering work, the project is simple. As a business proposition, the project is costly. Analyzing plan No. 1, it is seen that of the total cost, 6 per cent is for dredging, 13 per cent for bulkheading the banks, and 81 per cent is for acquiring the right of way, removing the structures thereon, and altering bridges. In other words, the cost of the project is increased fourfold because the necessity for the work was not perceived until after factories and railways had been permitted to be built and brigdes constructed without an appreciation of future needs. All of these constructions have been incident to the growth of the city and have contributed to the prosperity and riches of the city and State. To permit further growth and increased prosperity, the cost of the improvement proposed must be incurred. With each year of delay the ultimate cost will be increased.

30. Considering the advantages to be gained from the straightening of the Cuyahoga and the great cost of any project which will provide the betterment desired, it would seem to be the part of wisdom to determine what plan will be best for the long future and to begin to make provision for its accomplishment at as early a date as practicable.

31. It is the judgment of the board that all of the plans presented with the report are faulty in that none provide for a really unobstructed waterway, free from dangerous bends and with sufficient headroom under the bridges. The board believes that further study is required. It appears that the city of Cleveland is somewhat embarrassed in its consideration of this matter in dealing with property interests affected by not knowing what the attitude of the Government will be, and it is claimed that if the policy of the United States regarding the extent to which it would be disposed to cooperate in this work were made known, it would greatly assist the city of Cleveland in arriving at a definite plan.

32. As general commerce and navigation would be benefited by the proposed improvement, the board believes that the United States would be justified in participating in the work. It seems clear that inasmuch as the city of Cleveland will reap the principal benefits, it should bear at least those portions of the cost that the local interests are usually required to contribute, namely, the necessary reconstruction of bridges, the provision of right of way, and the bulkheading required for the protection of property abutting on the channel. As these constitute such a large portion of the total cost in this case, it is believed that the United States should assume the entire cost of the dredging, which is the only part of the work ordinarily undertaken by the Federal Government.

33. The board therefore recommends the tentative adoption of a general plan of improvement along the lines suggested herein, work to be begun under the conditions outlined above when the ity of Cleveland shall have presented a completed plan satisfactory o the Secretary of War. In order that the department may cooperate in the preparation of the plan to be finally adopted, it is recommended that an appropriation of $5,000 be made for this purpose.

34. In compliance with law, the board reports that except as contemplated by the above recommendations there are no questions of terminal facilities, water power, or other subjects so related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

W. M. Black,
Colonel, Corps of Engineers,
Senior Member of the Board.

SURVEY OF CUYAHOGA RIVER, OHIO.

United States Engineer Office,
Cleveland, Ohio, June 29, 1912.

Sir: 1. I have the honor to submit the following report upon survey and estimate of cost of improving the Cuyahoga River, Ohio:

2. The river and harbor act of June 25, 1910, contained the following provision under preliminary examinations and surveys:

> Cuyahoga River, Ohio, from its mouth to a more southerly connection with the Ohio Canal, with a view to eliminating bends and securing a navigable depth of twenty-one feet, with suitable width; with a report on any proposition for cooperation by localities affected thereby.

3. The duty of making the examination, etc., under the above was assigned to this office by letter of August 4, 1910, from the Chief of Engineers, but a question arose as to the intent of the law with respect to an estimate of cost. It was maintained by those locally interested and who had been instrumental in having the item referred to inserted in the act that the intent and understanding was that a survey and estimate of cost should be made without the usual preliminary examination and report on the advisability of the proposed improvement under the general provisions of the act, since in this case a report on any proposition for cooperation by localities affected by the proposed improvement was specifically called for, and it was held that this, by fair inference, at least, required a survey and estimate, because without estimate of cost no proposition relative to cooperation was practicable. This view was not concurred in by the Engineer Department and the Board of Engineers for Rivers and Harbors, but the river and harbor act of February 27, 1911, contained the following revised provision with respect to this river:

> Survey and estimate of the cost of improving the Cuyahoga River, Ohio, from its mouth to a more southerly connection with the Ohio Canal, with a view to eliminating bends and securing a navigable depth of twenty-one feet, with suitable width, and the said survey and estimate shall include a report on any proposition for cooperation by localities affected thereby.

4. The wording of this later act corrected the misunderstanding above referred to and the duty of making the survey and estimate was accordingly assigned to this office by letter of April 7, 1911 from the Chief of Engineers.

5. An outline map of the drainage basin of the Cuyahoga River is herewith showing the main topographic features and the relations of the river to the Ohio Canal. Other maps and drawings show in detail various local features, the results of the survey, and the pro

posed improvements that have been discussed or that are herein considered.

6. All available maps, surveys, and other data have been taken advantage of in preparing this report and much valuable information was supplied by the city engineer of Clevelend. The city has also assisted by making borings along the line of the proposed new channels. The field work done by this office has been confined to the comparatively limited amount of surveying necessary to connect up work already done and to procure certain additional data. The work was conducted with a view to procuring all information necessary for close estimates, but a full detailed survey of the character that would be necessary for construction purposes was not attempted, as this would involve an expenditure not at present justifiable.

7. The Cuyahoga is the second in importance of the streams tributary to Lake Erie (other than the Detroit River) in size and volume of flow, the Maumee being first. The shelter for the small boats of the period that the mouth of the Cuyahoga afforded suggested the beginnings of the harbor and city of Cleveland something more than a century ago, and the growth of the town followed, first from its being in addition to a lake harbor the point of transfer between land and water transportation on the early route between Pittsburgh and Detroit. Subsequently the mouth of the Cuyahoga became the starting point for the Ohio Canal, connecting Lake Erie with the Ohio River, and when the period of railroad construction began Cleveland was directly on the route that afforded the most favorable grades for a road from New York to Toledo and eventually o Chicago; this route being by the way of the Hudson and Mohawk River valleys and traversing the smooth and level areas that border he southern shores of Lake Ontario and Lake Erie. In more recent imes, with the extraordinary development of railroad construction nd of water-borne commerce on the Great Lakes, Cleveland is found n one of the most direct combined rail and water routes between he vast deposits of iron ore about the head of Lake Superior and the oal fields of western Pennsylvania, West Virginia, and southeastern Ohio. Over these routes there has been developed a very large olume of traffic in these two minerals, and remarkable economies ave been attained in transportation and in transfer between the ail and water portions of the routes. These conditions of position ith respect to the important land and water transportation routes f the country together with local advantages have resulted in develping a port accessible to the largest lake vessels, a system of railway rminals and rail connections with all the principal railway lines of e great east and west transportation belt of the United States, a ty which is second in population of the cities of the Great Lakes nd sixth among those of the United States, and which has large and pidly growing manufacturing industries, relating particularly to roducts composed largely of steel and iron.

8. The area drained by the Cuyahoga River is about 830 square iles in extent, and the monthly mean of its volume of flow varies om about 389 cubic feet per second to about 4,180 cubic feet per cond. These figures are taken from report of observations made this office, April, 1902, to June, 1904, and printed as Appendix AA20, report of the Chief of Engineers for 1904.

9. The work of improving the outer harbor at Cleveland and the entrance to the inner harbor at the expense of the Federal Government has been in progress for many years. Two side piers about 1,440 feet long have been built at the present mouth of the Cuyahoga. The inshore ends of these are approximately at the original lake-shore line, and the channel defined by them affording entrance to the river and inner harbor is about 300 feet wide and 21 feet deep. Just inside the inner end of this entrance channel the bridge of the Lake Shore Railway crosses the river, and through the bridge the channel has a width of only 130 feet. A project has been adopted by Congress, and an appropriation is now available for carrying the full width of channel past the bridge and to a point about 300 feet south of it where a similar width has existed for many years and where the channel is maintained by the city of Cleveland, but the execution of this work is waiting the adjustment of questions of titles to the real estate that it will be necessary to secure in order to excavate the channel and build the bulkheads.

10. Except as above, no improvement work on the Cuyahoga has yet been done by the United States, and no survey and estimate with a view to its improvement at Federal expense has heretofore been made. The only portion heretofore considered in connection with commercial navigation is that extending from the mouth to the recently erected Cleveland Furnace Co.'s works, just above Clark Avenue. This portion of the river is now about 5½ miles long, but its original natural length has been somewhat modified. From near the present mouth, the old river bed extends westward to nea the point where the river formerly discharged into the lake, about a mile west of the present mouth. The present mouth was formed before the arrival of white settlers, doubtless by the combined actio of recession of the lake shore and erosion in a bend of the river nea the shore line. The lower river and the old river bed constitute th inner harbor of Cleveland, and they have been under improvemen and gradual development and extension by the city for a great man years. The course of the river has been modified near Dille Avenu and at Jefferson Street; a system of dock lines has been laid out defining widths of the channel varying from 130 feet to 270 feet, an dredging has been done as necessary to secure and maintain throughout a depth of about 20 feet or sufficient for the largest lake vessels Bulkheading, generally of wooden pile construction, has been buil along both sides for the greater part of this channel, and concret bulkheading has been built at certain localities.

11. The channels of the inner harbor are crossed by 22 bridges o various kinds, but all are made to afford passage for vessels of th largest size that can use the channels at their respective location There are also 4 bridges above the present limit of navigation withi the city boundary.

12. The difficulties of navigation that it is desired to remed arise mainly from the narrowness and crookedness of the presen channel of the lower river and its deficient depths, and these defect have, of course, become more serious with the growth in size of th vessels that do business at this harbor. The present distance fro the mouth of the river to the upper limit of navigation for large vessels above referred to is about 3¼ miles in a direct line and by the rive 5½ miles, while the width of channel is quite variable and not consisten

throughout with the curvature and the location of terminals and landing places where vessels are moored. Turning space is not available to permit vessels to always go in or come out bow first and without the use of tugs. There is also a demand for extension of the channel farther upstream to give vessels access to exceptionally advantageous but at present undeveloped sites for manufacturing establishments, and for an increase in the extent of wharves and landing places on the inner harbor where freight may be received by and be discharged from vessels, with adequate connections with the railroads. Another consideration is the effect of floods in the river, and the availability of the inner harbor for safely laying up vessels during the winter season when navigation on the lakes is closed.

13. The Ohio Canal was opened for traffic in 1827, and it was built to afford a water route from Lake Erie to the Ohio River. It follows the Cuyahoga from Cleveland to within three-fourths of a mile of Akron, and it connects with the Ohio River at Portsmouth. Originally its connection with the Cuyahoga was at Superior Avenue, but this was changed about 1880 to the present connection, which is on the east bank of the river near Dille Avenue, where the connection is by a lock with a lift of 14 feet. This canal will not accommodate a vessel larger than 90 feet in length by 15-foot beam, with a depth of 4 feet, and at present there is practically no commercial navigation on it. One object of a more southerly connection between the river and the canal, as stipulated in the law, is to render more of the east bank of the river along which the canal runs available for commercial purposes. This is now prevented by the State ownership of the canal and the strip between it and the river, as well as by the proximity of the two.

14. The following memorandum, which was prepared in this office as a basis of a general discussion of the question, sets forth concisely the main features of the inner-harbor problem:

> An ideal plan for the inner harbor would be a channel sufficiently wide, deep, and straight to serve as a main "avenue" or highway for vessels of the largest class and extending upstream as far as the slope of the river will permit without resort to locks. Such a highway should afford free passage for large vessels both ways at all times, and this would require either sufficient width to permit vessels to tie up to wharves and landings both sides of the channel without obstructing it, or such regulation of the use of the banks of the main channel for mooring vessels as may be necessary to obviate obstruction. It is not improbable that the future development of the harbor may call for or justify more than one "highway" in places, and this should be kept in view in laying out a general plan.
>
> Connecting with the main channel or highway there should be side channels available, especially for wharves and landing places, where vessels may tie up to receive and discharge cargo, and these channels, if connected at both ends with the main channel and properly laid out as to curvature, need not be so wide as to permit vessels to pass both ways, since it will be practicable to restrict the movement of vessels in such side channels to one direction only. The harbor design should permit a vessel to readily come in, to go to any landing place, and to go out bow first, and this will call for turning basins in addition to giving the curved side channels connections with the main channel at both ends.
>
> Another very material advantage of the above general plan would be a great improvement in the capacity and availability of the inner harbor as a laying-up place for vessels n winter, where they can be taken in and out again with greater facility, and where hey will be more secure from danger in case of floods in the river than at present.
>
> Provisions for railroad connections with the various parts of the harbor and for the maintenance of existing rail lines without interruption, as well as the street communiations and bridges, constitute a part of the problem that is quite as important as the direct requirements of water traffic.

The practical working out of any plan approximating the above conditions will of course be an exceedingly complicated problem and one involving a large outlay for real estate and damages. The execution of any plan will take a considerable time, and an important feature of the work will be devising a program that will admit of progressive development; doing first what is most urgently necessary and undertaking the other parts in the general order of their need, while providing meanwhile for carrying on the business of the inner harbor without undue obstruction.

The advantages of a more southerly connection with the Ohio Canal will be that this will facilitate passage of canal boats to and from all parts of the harbor, while it will permit utilizing, for industrial purposes, the east bank of the river now cut off by the canal and will give adjacent areas access to the river and inner harbor.

15. An outline of certain natural features of the locality will assist in making clear the questions under consideration. The entire Cuyahoga River basin is within the area that was covered by the ice sheet in glacial times and the surface material has the characteristics of form and composition that are generally found in such areas. The underlying material is generally shale with approximately horizontal bedding and this is covered with a comparatively thin blanket of varying thickness composed of glacial "till," or clay, sand, gravel, and bowlders in varying mixtures. In the vicinity of Cleveland the country is a plateau having a somewhat irregular surface with a mean elevation above the lake of about 400 feet. This plateau is bounded on the north by a line of bluffs about 2 to 3 miles from the present lake shore, and between the bluffs and the shore is a nearly flat area sloping from an average elevation of 130 feet to about 40 feet above the lake level. This lower level or bench was formerly covered by the lake waters which extended to the bluffs. The city of Cleveland, except certain residence districts and a few localities that formerly had a separate existence as neighboring towns or villages, is mainly located on this lower area. All the streams in this locality have eroded deep and more or less sharply defined valleys or canyons in the till material and underlying shale. The lower Cuyahoga follows generally a broad and deep valley that was eroded in the shale previous to glacial times. This valley seems to have been filled up with glacial till material when the ice covered the country and as the ice withdrew the present Cuyahoga was formed following the same general course, but it has only partially removed the later deposit that filled the ancient valley, so the present valley of the river is much narrower that that of ancient times and its bed and banks are formed of comparatively soft material. There is, however, a considerable area of bottom land which is generally flat and as a rule sharply defined by the bordering bluffs or slopes. Below about Clark Avenue this bottom-land area is almost entirely occupied by buildings and factories and industries of various kinds. There are also several railroad lines with yards, depots, and freight houses. Above Clarke Avenue there has been very little utilization of bottom lands for commercial or industrial purposes, except for the canal and railroad lines that pass through them.

16. The proposed improvement of the Cuyahoga River is a matter in which the local public has taken a very great interest, as it vitally concerns the future growth and development of the harbor and the city. There has been a large amount of discussion of the question by special conferences with individuals and numerous committees, and a public hearing was held by this office on October 6, 1911, at which the main features of the problem were outlined and discussed in a general way. Since that date the local commission appointed

by the mayor of the city upon the suggestion of the Chief of Engineers to consider the general harbor problem has conducted a number of public hearings, partly in cooperation with the officer in charge of this office, and copies of the stenographic reports of all these have been furnished for use in preparing this report. Final conferences were held with the various local commercial organizations interested, and with the county and city representative officials before concluding the report. The suggestions, conclusions, and estimates herein presented are those arrived at by the district officer after considering all available facts and the numerous views that have been presented.

17. In regard to the extent and scope of the survey and estimate which the law contemplates, it has been assumed that the "more southerly connection" with the canal is not to be interpreted as farther upstream than a point to which a 21-foot channel can successfully be carried without resort to locks, or in other words, that any improvement of the Cuyahoga contemplated by the law under which the survey and estimates are made would be in the nature of an improvement and extension of Cleveland's inner harbor, and that such extension of a 21-foot channel inland as would require locks would be in the nature of an inland waterway which Congress has not yet considered.

18. In considering an improvement of this nature the dimensions of the vessels for which the channels are designed should first be taken into account, and it is usual to allow for a certain increase in size over the dimensions of present vessels by some process of estimate or guessing. A complete and logical treatment of this phase of the question would involve an analysis of the relative economies of handling the business to be done, on the one hand in such vessels as the ship designers and builders may choose to construct, with channels, bridges, harbors, etc., adapted without question and at public expense to vessels that may be built, and on the other by doing the same business in vessels of the present size or in vessels whose dimensions are to be restricted to certain limits, with channels and structures to accommodate them limited accordingly. I am not aware that such an analysis has heretofore been made or that works of channel and harbor improvement have been designed on such a basis, even for our most expensive works, and one harbor could not of course be considered by itself from such a standpoint. One dimension of the proposed improvement, the depth of the channel, is xed by law, and this conforms to the depths provided for the largest lass of vessels in use on the lakes at the present day. It is therefore ssumed that in other respects the improved channels are to be dapted to the present greatest dimensions for ore and coal and grain arrying boats, and these are about 600 feet in length by about 60 eet beam. Channels that will permit the free movement of a vessel f this type will in general accommodate the largest package freight nd passenger vessel of the present time.

19. The following is an outline description of the improvements erein proposed to correct the difficulties now experienced, and in onformity to the law, beginning at the river mouth or entrance to the ner harbor:

The extension of the 300-foot wide channel from just north of the ake Shore Railway Bridge to near the entrance to the old river bed now provided for, if the legal difficulties can be removed, as already described, and it is proposed to continue an effective channel width of 300 feet with necessary rectification of the sharp curve at the old Superior Viaduct to near the new Baltimore & Ohio lift bridge. From this point up stream two plans have been considered. In plan No. 1 a cut having a minimum width of 250 feet is made across the neck coming into the present river again between the lower and middle bridges of the Cleveland, Columbus, Cincinnati & St. Louis Railway Co.; another in continuation of this is carried across the next neck or bend above, and comes into the river opposite the Cincinnati Slip. These two cuts eliminate both Irishtown Bend and Collision Bend, and space for turning large vessels is provided where the present river is crossed between the lower and middle Cleveland, Columbus, Cincinnati & St. Louis Railway bridges. The eventual complete removal of the old Superior Viaduct is assumed and an additional lift span for the Baltimore & Ohio Railway bridge will have to be provided. The new channel under the proposed new high level bridge will require adaptation of that structure to the needs of navigation, either by duplication of the span already approved for crossing the river, or otherwise, or boats will have to be adapted to a less height than the 93 feet clearance now called for. At the foot of Superior Street the present dock line may be either left as it is, providing a safe landing place for boats without interfering with those passing in the widened channel, or the dock line may be so adjusted as to extend somewhat the space in this locality available for docks and structures.

20. An alternative plan, called No. 2, has also been considered. This contemplates following the present river as far up as the neck just south of the Upson Nut Co.'s works, widening the river as necessary to give an effective width of about 200 feet, and cutting through the above neck, giving the cut a channel width of about 225 feet and coming into the river again above the Cincinnati Slip. Above this point only one plan has been considered. This involves some modification of the dock line up to near where Mahoning Avenue comes into the river. This avenue is followed by a cut 200 feet wide, which comes into the river again a short distance below the Erie Railway bridge. From this point the dock lines already established by the city, and giving a channel width of about 200 feet, are to be followed to their upper limit at the Cleveland Furnace Co.'s plant.

21. The relative advantages of plan No. 1 and plan No. 2 have been exhaustively discussed during the various hearings and conferences. One of the principal considerations is the effect on the high-level bridge that is to be built to cross the river and valley, connecting the two parts of the city separated by the river, and permitting vessels to pass through without requiring an opening in the bridge that will interrupt traffic over it. The construction of this has recently been started, after protracted delay, and its completion is urgently demanded by the local public, particularly by those whose interests are on the west side of the river. The span of this bridge that covers the present river channel has been approved by the Federal authorities under the laws governing the construction of such bridges, but the complete bridge plans have not been submitted for approval.

Plan No. 1 calls for excavating another channel under this bridge and would require an opening of the proper width and height to span it, while by plan No. 2 the present river span would suffice. In this regard, therefore, plan No. 2 has the advantage. This latter plan would eliminate one of the most troublesome places in the present river, Collision Bend, but would call for widening of Irishtown Bend. It requires a very deep cut near the Upson Nut Co.'s works and expensive readjustment of railroad tracks and bridges in the same locality. Since it calls for widening a long stretch of river in Irishtown Bend it would result in considerably greater inconvenience to navigation while it was being carried out than plan No. 1. The one cut shortens the river more than either cut of plan No. 1, and the resulting disturbance of the slope and the current would be greater. Plan No. 1 calls for adaptation of the new high-level bridge, duplication of the Baltimore & Ohio Railway lift bridge span, and other expensive bridge work; it affords a turning place for ships in the lower river, which the other plan does not; it gives a more direct highway to the upper river; and it leaves a greater portion of the present river for use for wharves and landings. In estimated cost the total is shown to be rather more advantageous for plan No. 1, but probably the margin of variation would warrant the statement that in cost there s not much difference between the two.

22. An estimate has also been prepared by the city authorities and checked by this office, of the cost of widening the river and easing the bends so as to diminish the difficulties without eliminating bends or making other material changes in the present general course of the tream. The total of this estimate was about $4,500,000. In general erms it is evident that any satisfactory remedy for the present conditions in the lower river will be in the nature of a piece of heroic urgery, and it will be very expensive. The longer it is deferred the more it will cost.

23. It is my opinion that plan No. 1 is preferable for a radical improvement, and it seems to me doubtful if plan No. 2 is worth undertaking. Plan No. 3, as it has been called, does not seem worth ndertaking as a whole, but it would be advantageous to improve onditions here and there, at the worst bends, at the bridges, and erhaps in other localities as financial resources may permit, since uch work will be permanently advantageous should the rectification f the channel be undertaken later. It must be clearly understood, owever, that a thoroughly satisfactory improvement, according to lan No. 1, will involve modification of the present bridge plans or oncessions on the part of navigation interests regarding the height the navigable opening, or it may call for both.

24. Above the terminus of the present dock lines the improvement erein proposed is to a considerable extent tentative and is based rgely on a project that has been prepared by the several owners of roperty immediately affected. The channel terminates in a turning asin near Harvard Avenue Bridge where connection is made with the Ohio Canal by one or more locks. A more definite layout for this pper improvement will have to await the results of negotiations mong the owners of the land involved, and these negotiations are sill in progress.

25. The estimates submitted provide for excavating and bulkhading all the new channels proposed throughout and for restoring resent bulkheading where same is to be removed in widening existing

channels. The borings and examinations show that the excavation will all be in soft material or material that can be handled by ordinary digging processes without resort to drilling and blasting.

26. A possible further extension of the improvement above the Harvard Avenue Bridge has been suggested by those interested and it has been proposed that a deep channel might be carried possibly as far up as Thornburgh. The river valley has the general characteristics that are found below the Harvard Avenue Bridge up to this point, and even farther, and with the existing and possible railroad and canal connections, sites for manufacturing establishments would be developed and greatly enhanced in value by the extension of a deep-water channel farther up the valley if it were practicable. The practicability of such a channel is somewhat doubtful, unless locks and perhaps other works to control floods were resorted to, and a further consideration of this part of the subject is not believed to be appropriate in this report for reasons above explained.

27. It is understood that the land in the valley above the Harvard Avenue Bridge is generally divided into small holdings. Below this bridge the undeveloped property is largely under the control of a few large companies or associations. The undeveloped bottom land area below Harvard Avenue Bridge is estimated at about 1,125 acres. Between Harvard Avenue Bridge and Thornburgh the bottom lands have an area of about 1,925 acres. These bottom lands are subject to overflow during high stages of the river, and this effect and the troubles of vessels laid up in the harbor have been aggravated by ice jams. The proposed work of straightening and deepening the lower river channel will at least reduce these difficulties even if it does not entirely remove them. The question of floods and ice jams in the upper part of the lower river here considered is of more concern to owners of buildings and other improvements on shore than to the navigation interests, since high water does not ordinarily occur during the season of navigation. Vessels laid up in the curved bends that are to be cut off by the river straightening will be practically safe from the effects of flood and ice.

28. The expense of maintenance of the enlarged and rectified channel will be mainly for dredging to remove the material brought down by the river. The city has expended annually on dredging in the river an average of about $46,000 per year since 1901. During this period the dredged channel has been extended upstream considerably but there does not appear to be an increase in the amount of dredging required proportional to the length of channel maintained. The new channels will add to the length to be maintained about 4,000 to 5,000 feet, according to the plan adopted, as the bends still have to be maintained, and the width of channel to be maintained will be increased. The amount of material brought down by the river tha causes the deterioration should not be greatly increased and it will be deposited generally speaking farther upstream. In the upper portions of the proposed improvement the river now deposits sand which has a commercial value and it is dredged for the market. The turning basin at the upper part of the proposed channel and a certain portion of the channel below will probably catch a considerable amoun of sand and the value of this will help meet the cost of maintenance There are, of course, undetermined elements in the problem, but as a

approximate figure the annual cost of maintaining the new channel may be placed at not over $75,000.

29. No proposition for cooperation in the proposed improvement by the localities affected has been received. Such proposition will necessarily be dependent upon the estimates. These have been furnished to those interested and any proposition for cooperation that may be received will be at once forwarded with any specific recommendations relative to the advisability of participation in the proposed improvement by the Federal Government that may be appropriate.

30. Obviously the proposed improvements by either plan up as far as the Cincinnati Slip will not be of material use until completed, except that widening the bend at Irishtown would be advantageous of itself to a considerable degree without regard to the cut south of the Upson Nut Co.'s plant. The sooner this part of the improvement could be completed, whichever plan is adopted, the better, and if undertaken the work should be pushed through as rapidly as practicable. It could probably be completed in three working seasons, either by No. 1 or No. 2 plan.

31. The Mahoning Avenue cut is less urgent, and while desirable, t can be deferred until there may be a greater development of ndustries above. The bend which this cut avoids is considerably ess troublesome than those below. The proposed rectification above the Cleveland Furnace Co.'s plant can await the convenience of he owners of the adjacent property.

32. A tabular statement is herewith, giving in detail the present uses of both banks of the river from the mouth upstream. This mbodies the special information regarding terminals, etc., required by law. Photographs are submitted giving views of the several proposed cuts for straightening the river, and commercial statistics nd other data are given in an appendix.

33. To what extent, if any, the United States should participate in he proposed improvement is almost entirely a question of policy which can only be determined by the law-making authority. The ver and harbor act of March 3, 1909, contained the following rovision:

> The Secretary of War is authorized to appoint a board of engineers to examine those arbors on the Great Lakes and elsewhere in which the whole or a part of the harbor improved at local expense, which board shall make recommendations with a view determining whether the improvements so made by local authorities should be ndertaken or maintained by the General Government and to establish uniform rules making harbor improvements.

The following was one of the board's recommendations:

> 3. That the work of the Government at any harbor be confined to the general part the harbor, including, as may be necessary, the construction and maintenance of eakwaters with the general anchorage area protected thereby, of entrance piers d jetties at the mouths of inner channels, and the portion of such channels immeately between them, and also of such long general channels of approach as may be cessary to connect the harbor with outside deep water.
>
> With regard to the first provision of the law, regarding those harbors in which the hole or part of the harbor is improved at local expense, the board recommends that e improvements so made by local authorities should not be undertaken or mained by the General Government.

The board's report dated December 18, 1909, was duly transmitted Congress and was printed as House Document No. 1067, Sixty-first

Congress, third session, but no formal action relative to the recommendations has been taken by Congress, and appropriations for harbor improvements made since that date do not indicate entire uniformity in providing for harbor works at Government expense. A tabular statement is submitted giving totals to date of expenditures by the Federal Government and by local interests, respectively, at the more important harbors on the Great Lakes. The expenditures on inner and outer harbors are given separately as far as practicable. This statement shows a wide variation from uniform rules. Precedents can be found for making practically the entire improvement of Cleveland's inner harbor at Federal expense; for making it by cooperation of the Federal authority and the local interests; or for doing no work at Federal expense inside of that already provided for at the Lake Shore Railway bridge.

34. The proposed improvement does not at present contemplate a system of publicly owned wharves. All wharves where coal, ore, iron, sand, and stone are handled have mechanical appliances for this purpose, but such appliances are not in general use for handling package freight.

35. There are no questions of development of water power directly involved in the proposed improvement.

36. It is my opinion that this improvement substantially as outlined under plan No. 1 is worthy of being undertaken, to provide for and insure the development of the harbor and city of Cleveland to the fullest extent practicable, and to utilize to the highest degree the natural advantages and the commercial and industrial possibilities of the locality. If it is not found practicable to undertake plan No. 1, I believe that improvement work in the way of widening, easing bends, improving navigation conditions at the bridges, etc., should be confined to the river in its present location up to the present upper limits of navigation at the Cleveland Furnace Co.'s works. If improvement above that point is undertaken it should be according to the plan outlined in this report.

37. The following are the estimates of cost of improving the Cuyahoga River according to the various plans referred to in this report:

Plan No. 1.

1. Real estate required (exclusive of parcels owned by city), appraised value plus 50 per cent	$1, 038, 91
2. Clearing right of way of buildings, etc. (estimated that salvage on material will cover)	
3. Excavation, 1,241,075 cubic yards, at 15 cents	186, 16
4. Bulkheads, 8,210 linear feet, at $50	410, 50
5. Bridges (2 railroad, 1 highway, and 1 combined)	1, 200, 00
Total	2, 835, 57
In round figures	3, 100, 00

Plan No. 2.

1. Real estate required		$1, 009, 60
2. Clearing right of way		
3. Excavation:		
537,448 cubic yards, at 25 cents	$134, 362	
1,127,830 cubic yards, at 15 cents	169, 175	
		303, 5

4. Bulkheads, 9,895 linear feet, at $50	$494,750
5. Bridges (2 railroad, 2 highway, and 1 combined)	1,200,000
Total	3,007,889
In round figures	3,300,000

Mahoning Cut.

1. Real estate required	$836,760
2. Clearing right of way	
3. Excavation, 588,500 cubic yards, at 15 cents	88,275
4. Bulkheads, 4,875 linear feet, at $50	243,750
5. Bridges (1 railroad and 1 highway)	400,000
Total	1,568,785
In round figures	1,700,000
Plan No. 1, total, including Mahoning cut—round figures	4,800,000
Plan No. 2, total, including Mahoning cut—round figures	5,000,000

NOTES.

(*a*) Estimates on real estate have been checked by an estimate per square foot ased on prices that have been paid by the city for land in this vicinity.

(*b*) In the estimates for real estate based on appraised values entire parcels have een included, many of which extend beyond the boundaries of the actual areas hat will be required for the proposed cuts, and no deductions have been made on ccount of probable value of such excess areas.

(*c*) Estimates on excavation do not take account of possible salvage from use of naterial elsewhere for filling and reclaiming submerged areas.

(*d*) Estimates on bulkheads contemplate modern concrete piling or similar permanent construction.

(*e*) Estimate on cut at Upson Nut Co.'s works, plan No. 2, includes excavation ecessary for modifying Erie Railroad tracks.

pproximate estimate on improving upper river from Cleveland Furnace Co.'s plant to Denison-Harvard Bridge.

[It is assumed that real estate for channel will be furnished free of cost.]

Excavation, 2,000,000 cubic yards, at 10 cents	$200,000
Bulkheads (wooden), 16,180 linear feet, at $25	404,500
Bridges	300,000
Lock, connection with canal, and turning basin	100,000
Total	1,004,500
round figures	1,005,000

Very respectfully, your obedient servant,

John Mills,
Colonel, Corps of Engineers.

The Chief of Engineers, United States Army.

[First indorsement.]

Office of Division Engineer, Lakes Division,
Detroit, Mich., July 25, 1912.

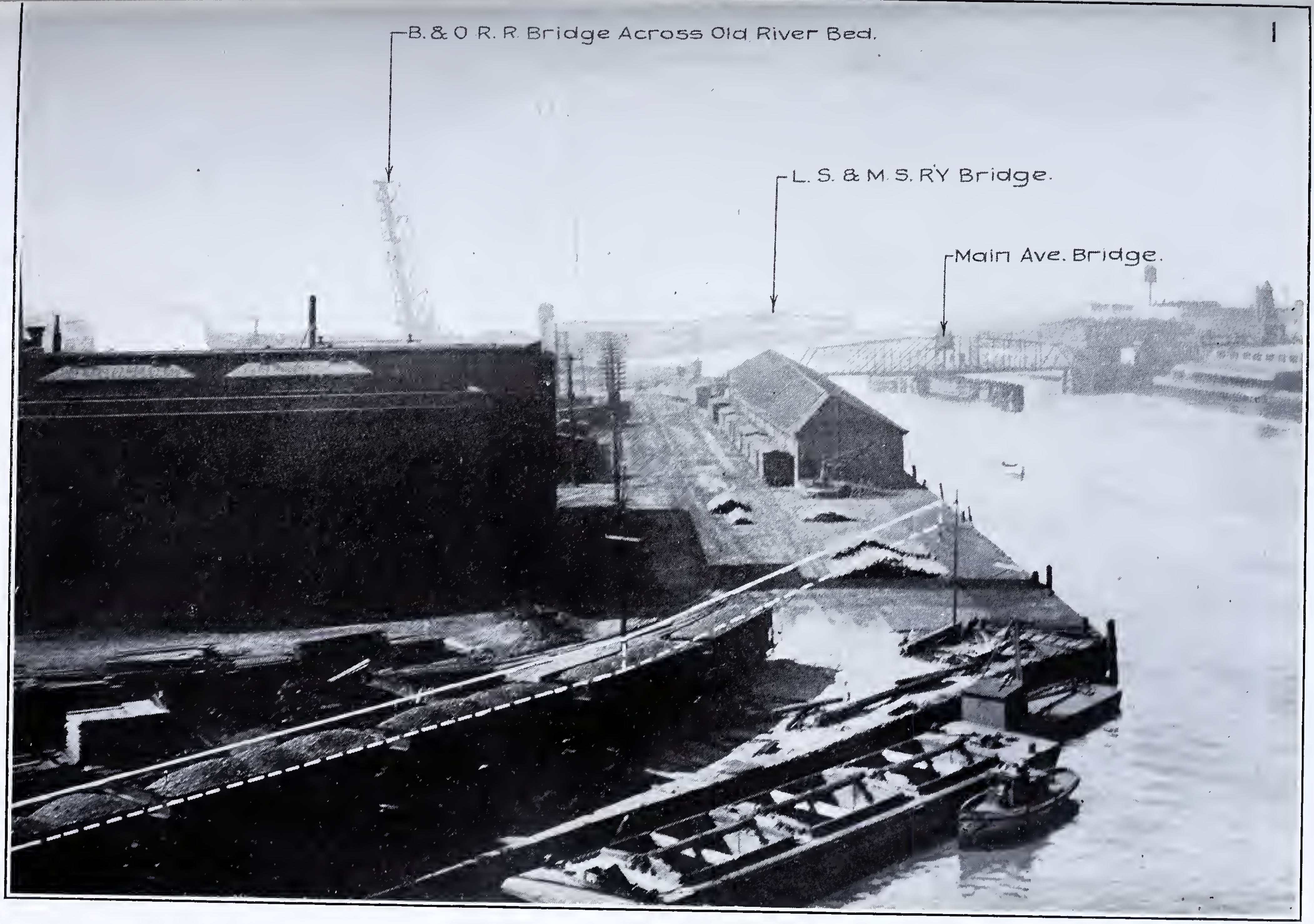
1. Respectfully forwarded to the Chief of Engineers, United States rmy.

2. Through freight, which constitutes a large part of the commerce of eveland and consists of iron ore, coal, and package freight, is prinpally handled in the outer harbor, Old River, and the portion of yahoga River below Superior Street. Lumber, stone, sand, and avel, which are also large items in the commerce of the port, are rried in relatively small vessels, which can navigate the river without ther improvement.

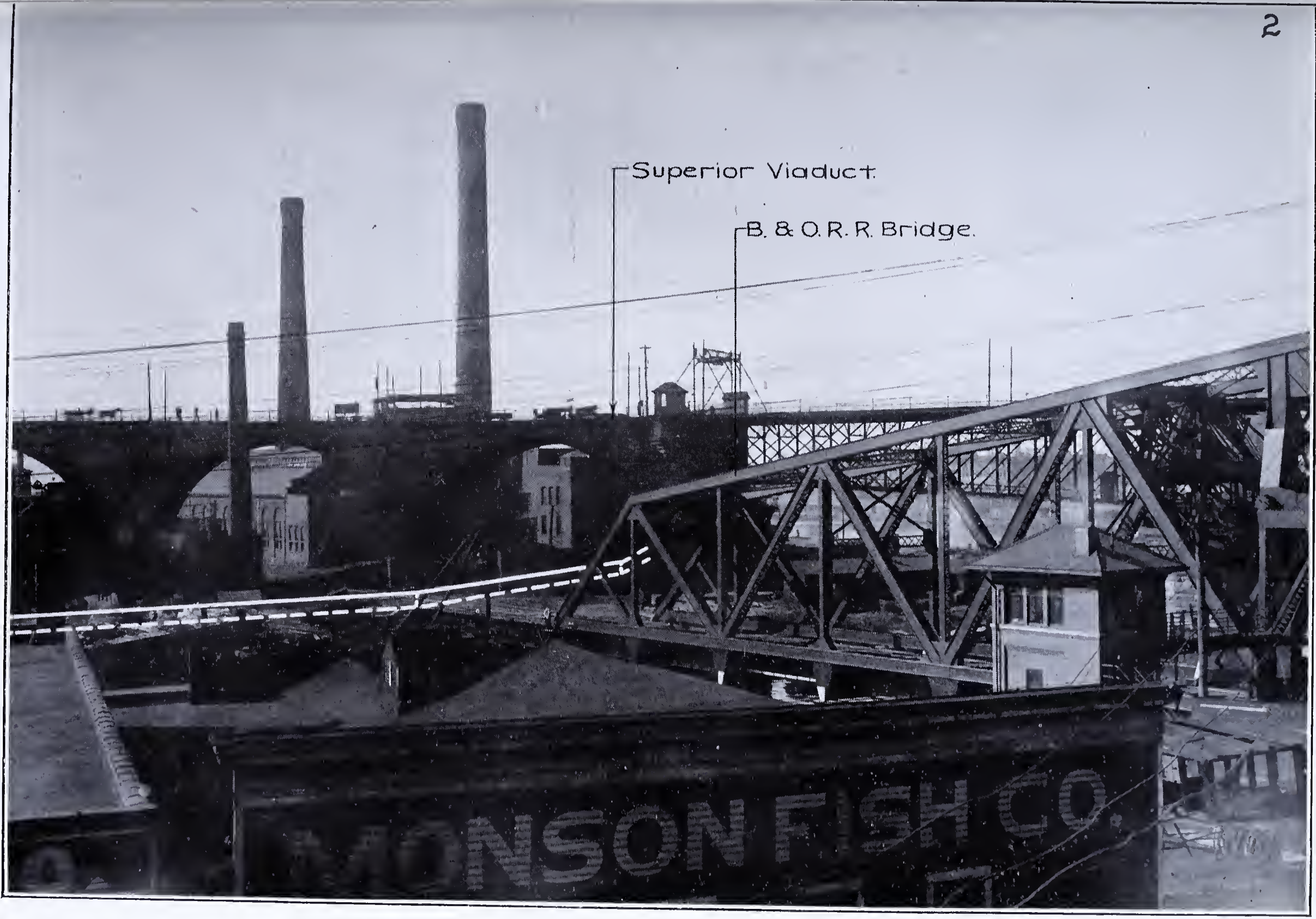
3. The principal purpose of the proposed straightening of the river is therefore to develop certain lands in the southern section of the city as manufacturing sites, and I am of the opinion that improvements of this character should be made by local authorities rather than by the United States; but, as the district officer shows, there are numerous precedents where such work has been done by the General Government. In none of the precedents cited by him, however, has the United States purchased the land required for the improvement nor changed the existing bridges, and I have therefore to recommend the improvement of the Cuyahoga River be not undertaken by the General Government unless the city of Cleveland provides the right of way, rebuilds the bridges, and bulkheads the property to be improved.

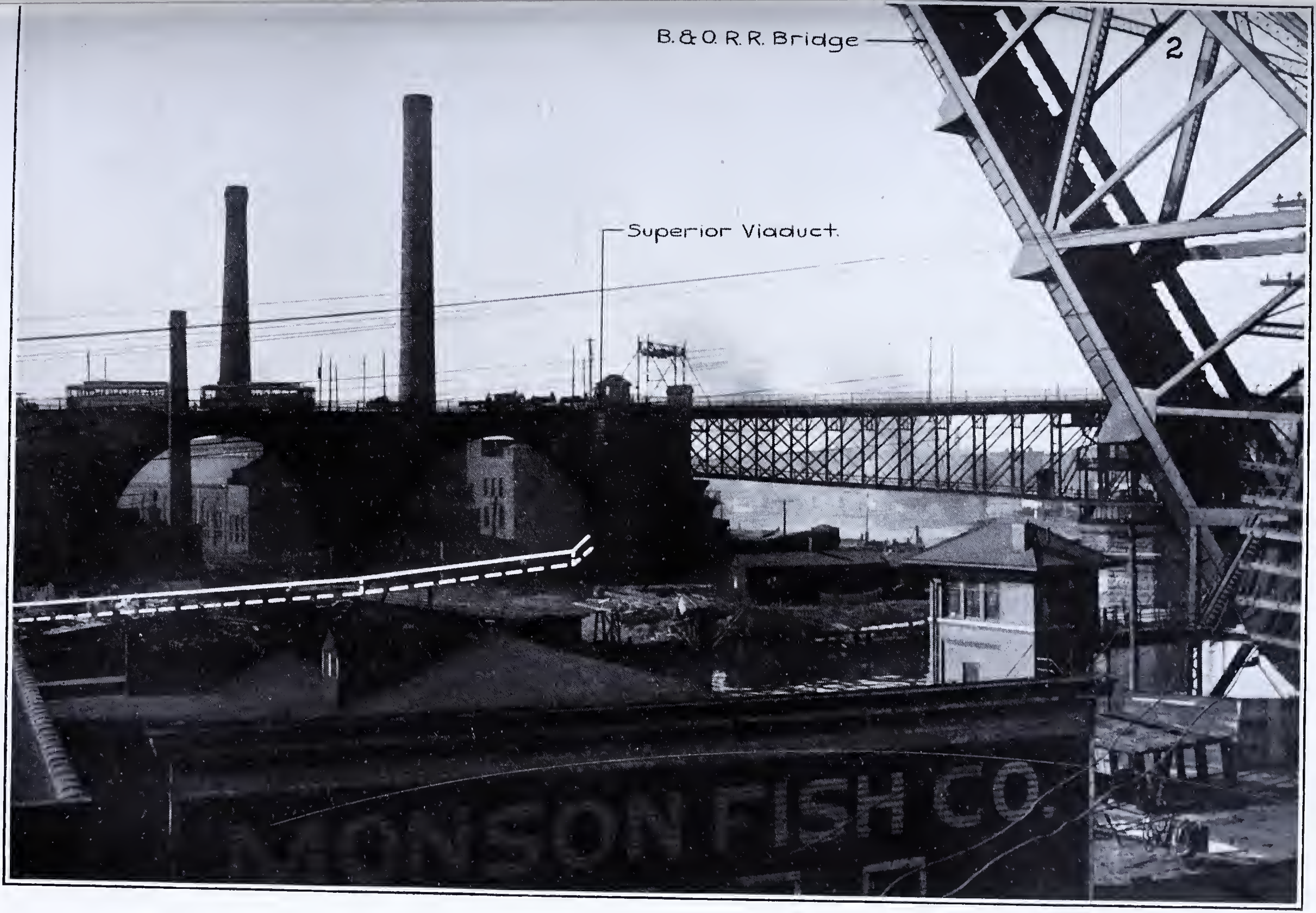
C. McD. Townsend,
Colonel, Corps of Engineers,
Division Engineer.

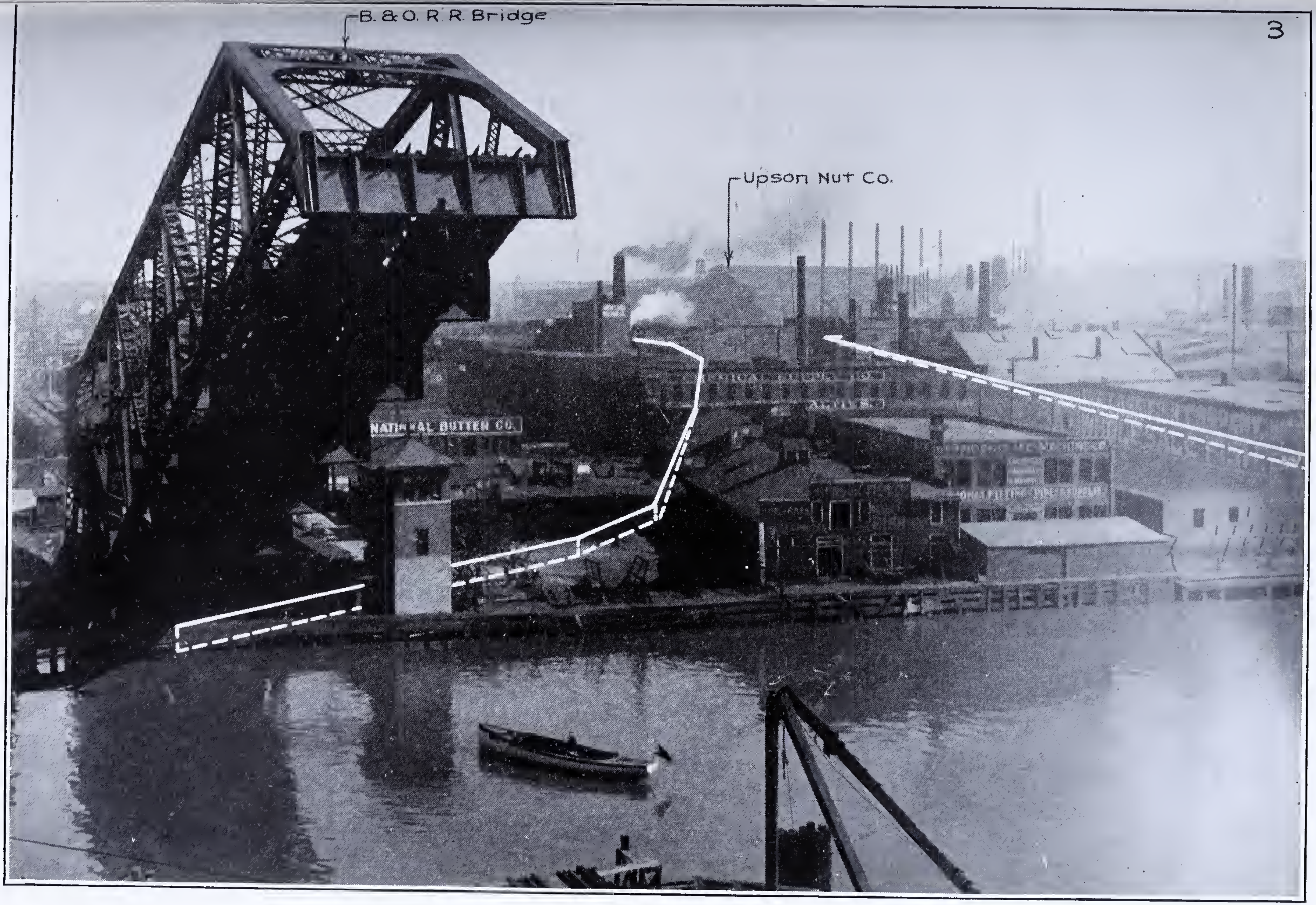
[For report of the Board of Engineers for Rivers and Harbors, see p. 4.]

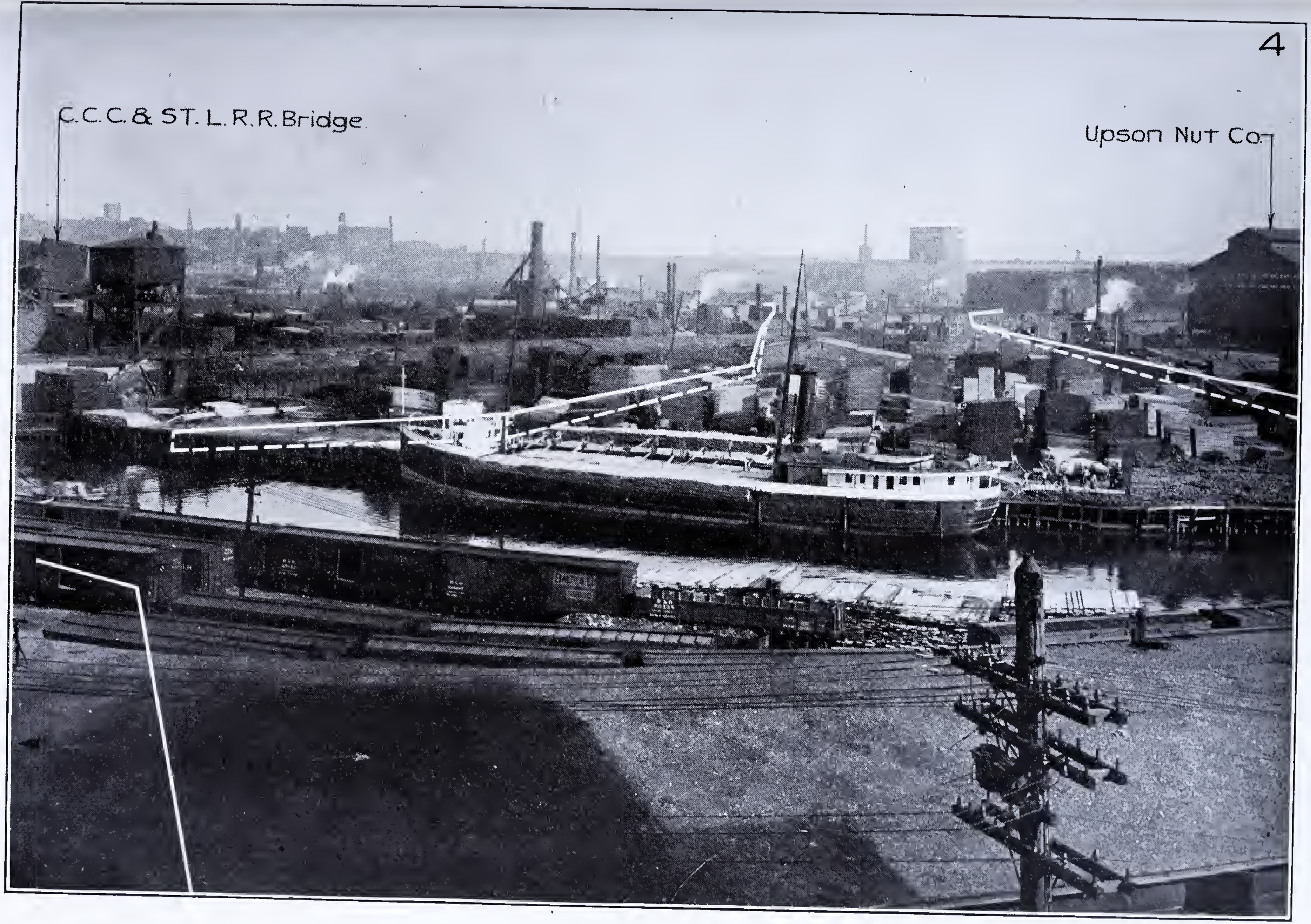

B. & O R. R Bridge Across Old River Bed.
L. S. & M. S. RY Bridge.
Main Ave. Bridge.
1

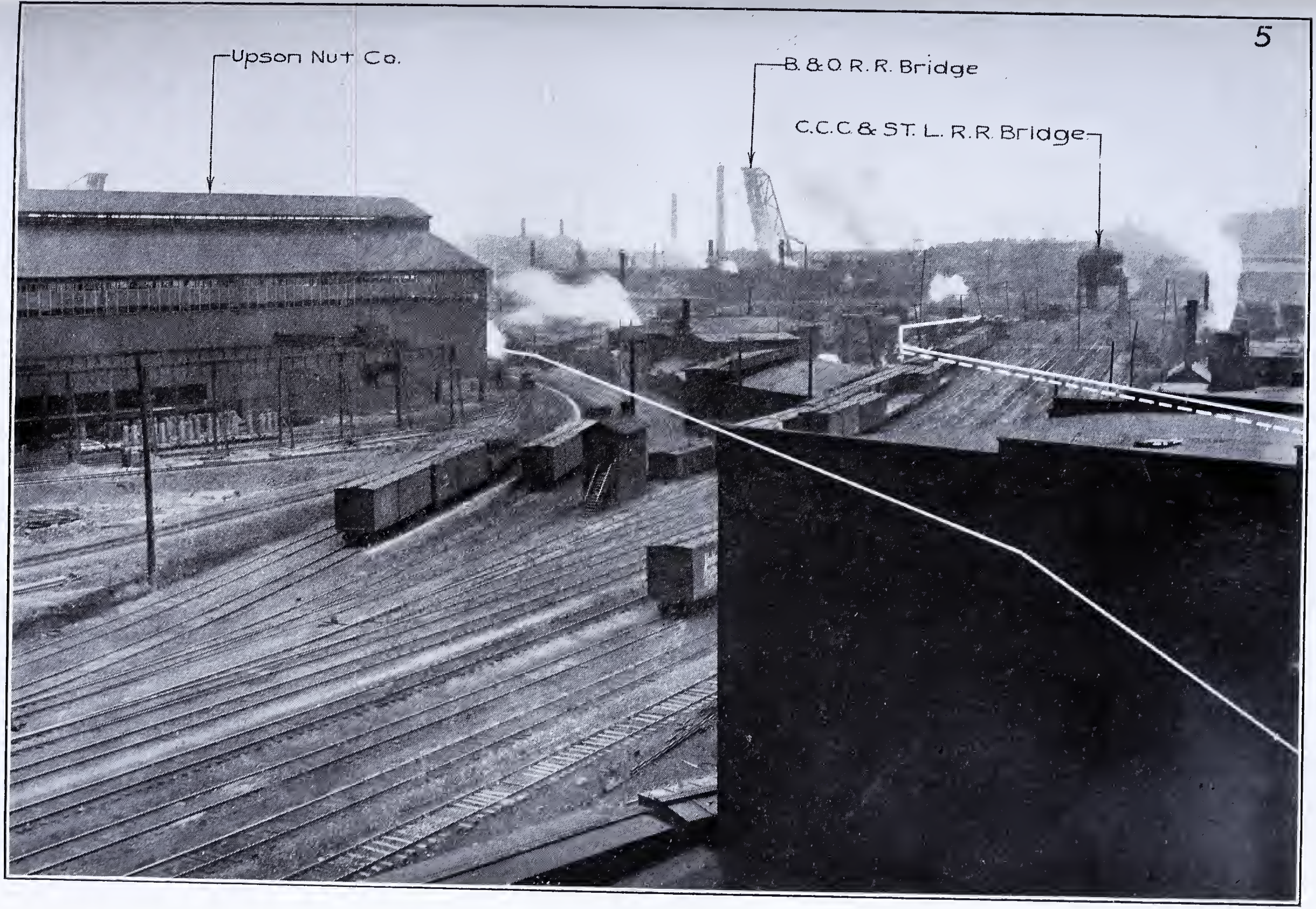
2

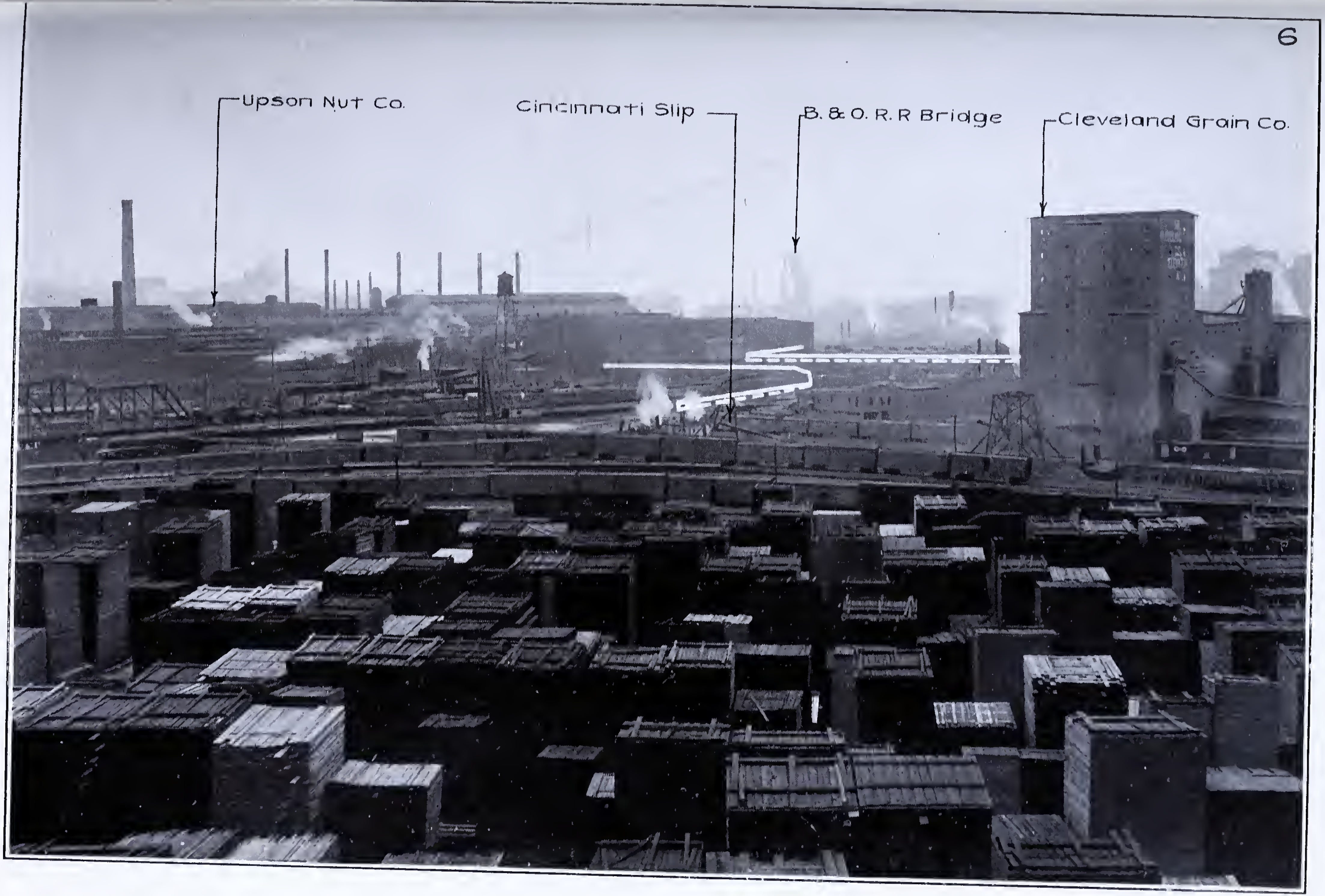



B.&O. R.R. Bridge
2
Superior Viaduct
ONSON FISH CO.

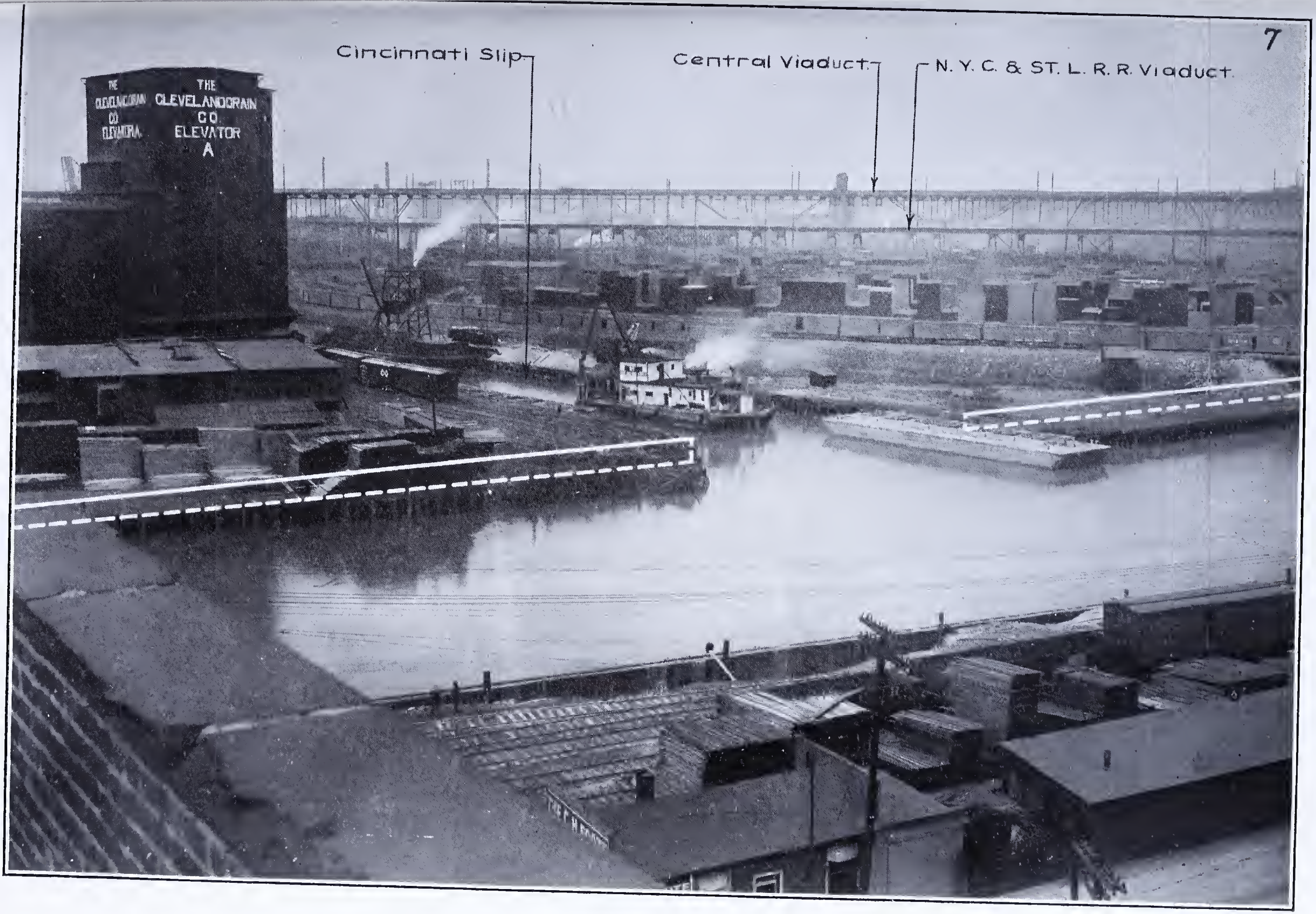

B. & O. R. R. Bridge
3
Upson Nut Co.
NATIONAL BUTTER CO.


4
C.C.C. & ST. L. R.R. Bridge
Upson Nut Co.

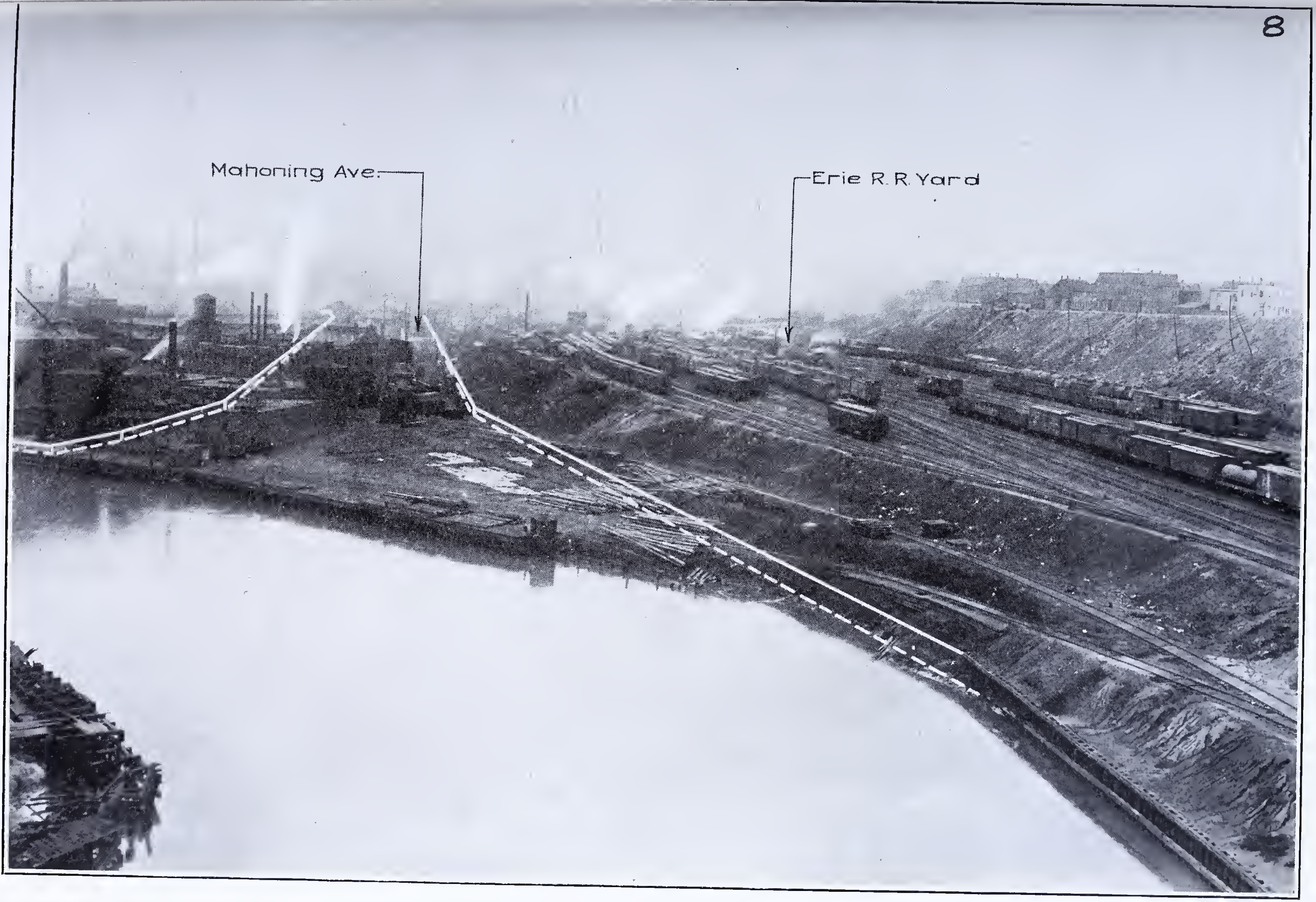

5
Upson Nut Co.
B. & O. R. R. Bridge
C.C.C. & ST. L. R.R. Bridge


Upson Nut Co.
Cincinnati Slip
B. & O. R. R Bridge
Cleveland Grain Co.

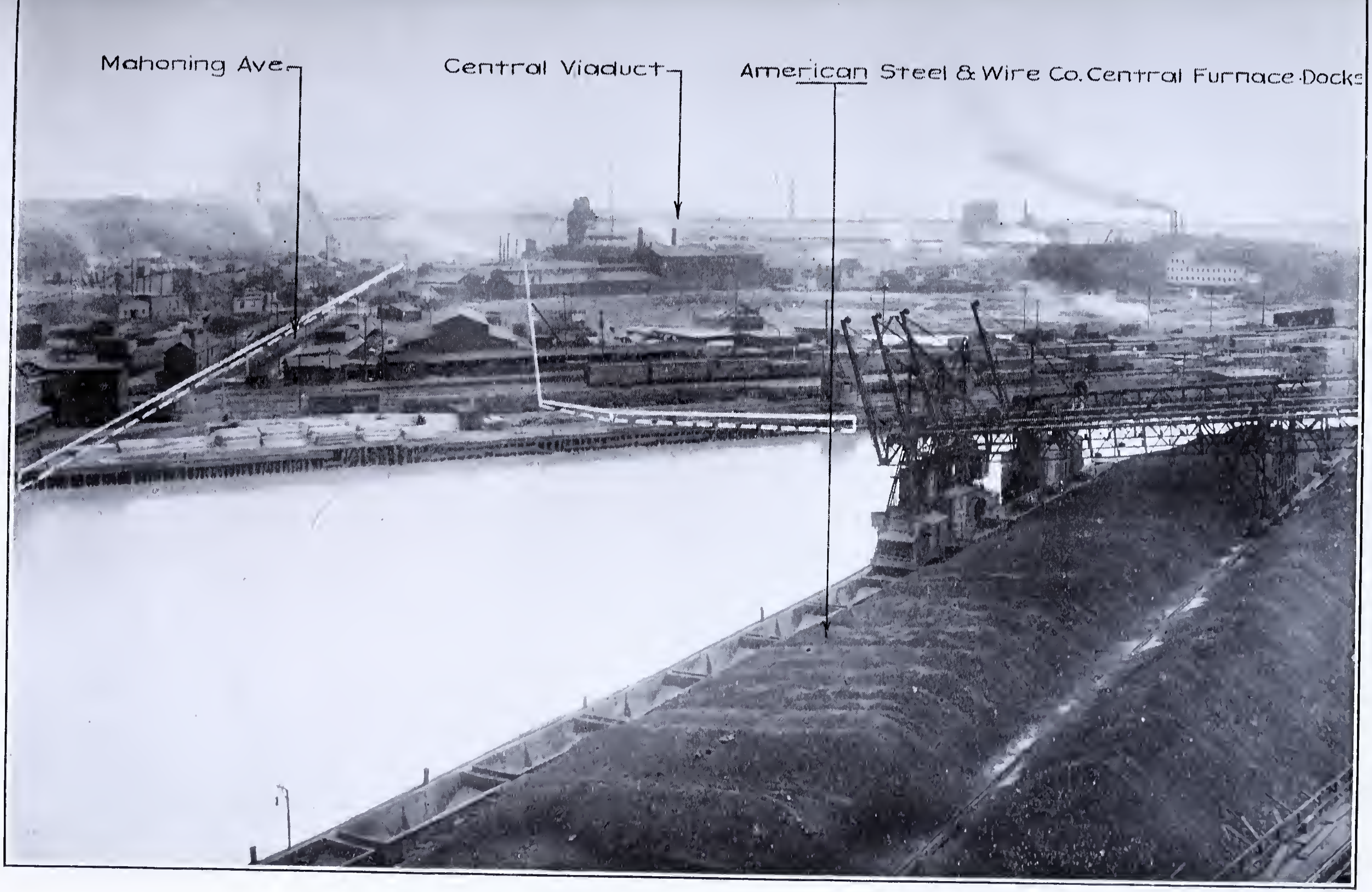
6

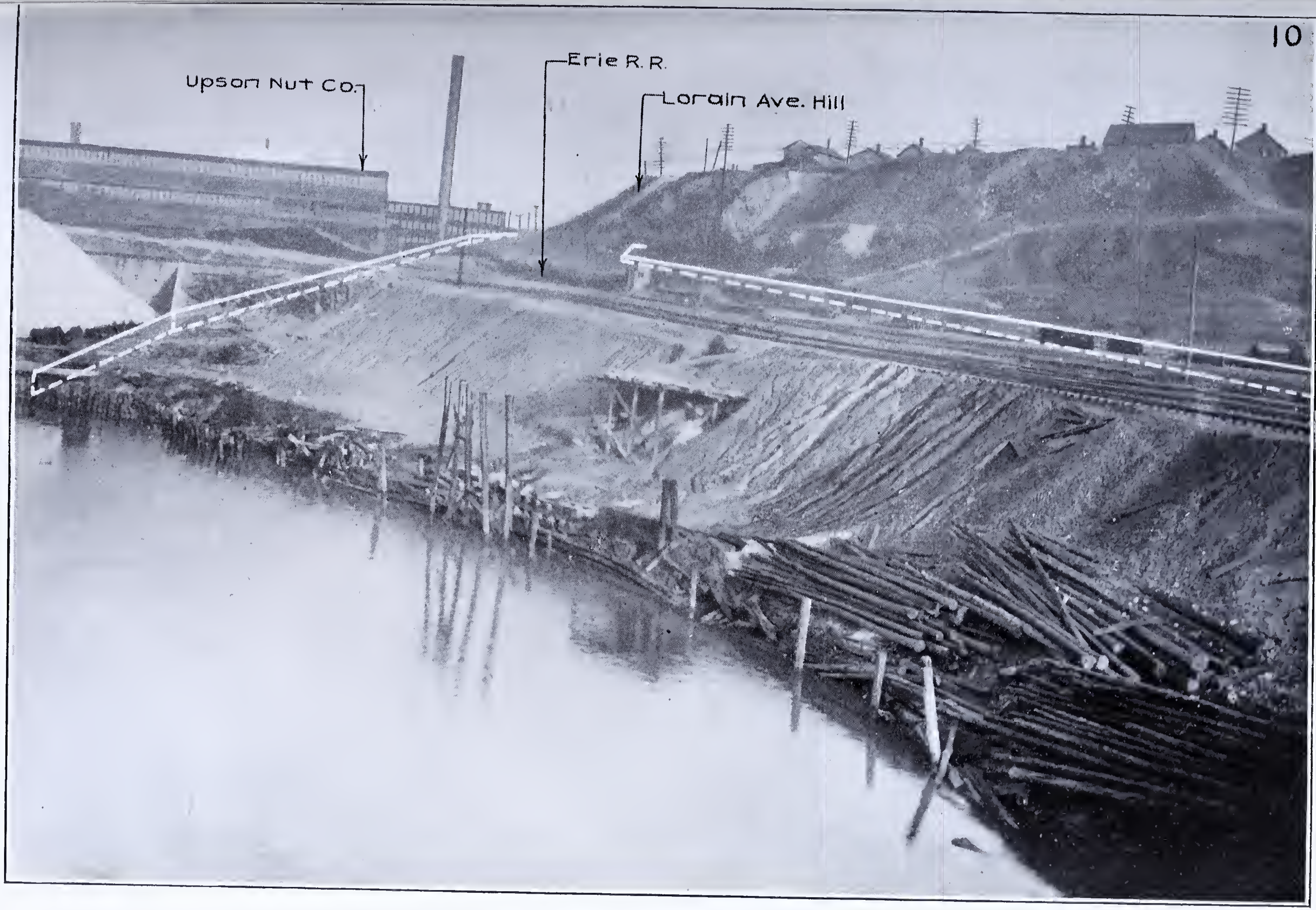

Cincinnati Slip
Central Viaduct
N. Y. C. & ST. L. R. R. Viaduct
7
THE CLEVELAND GRAIN CO. ELEVATOR A
THE CLEVELAND GRAIN CO. ELEVATOR A

8



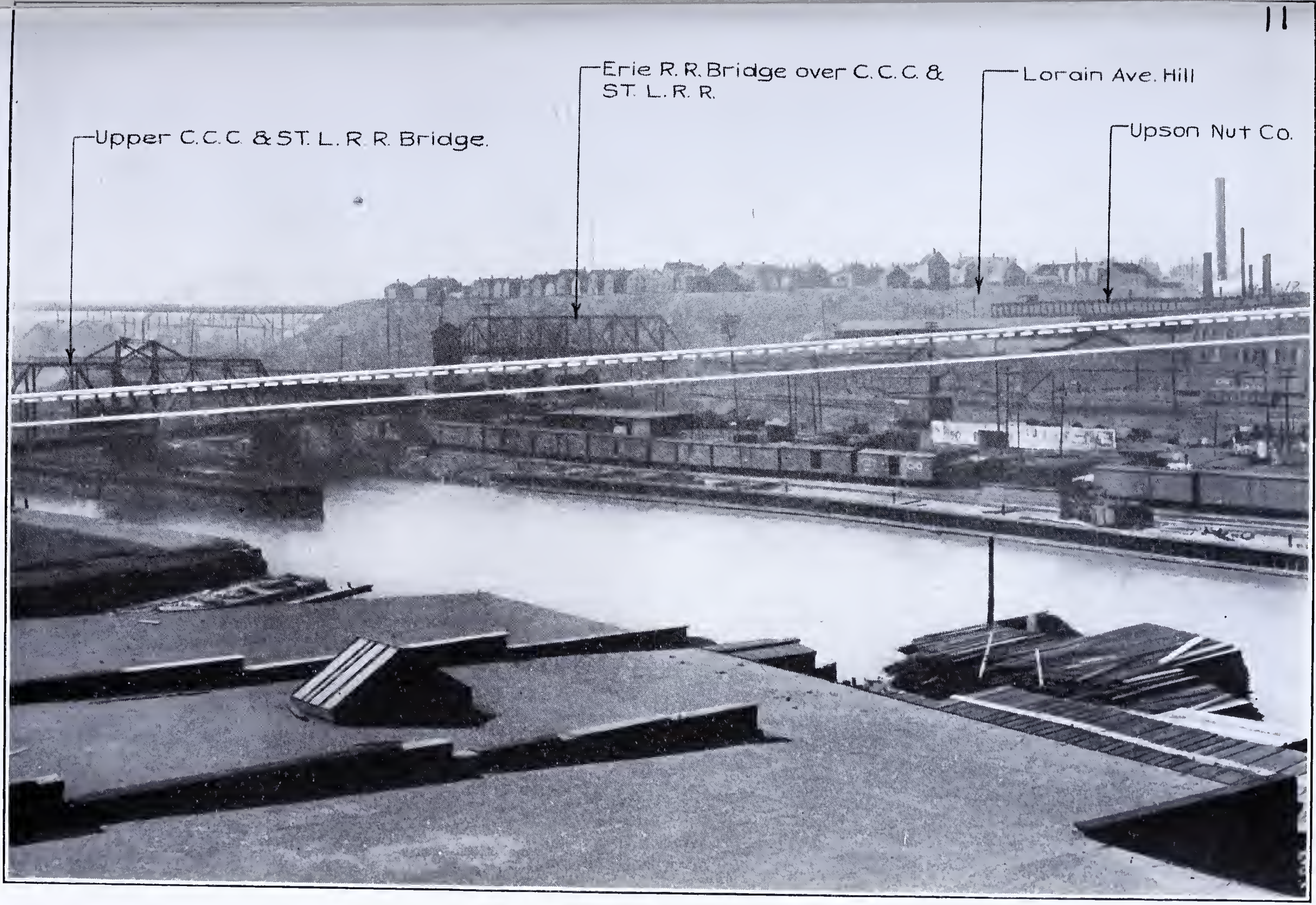
9

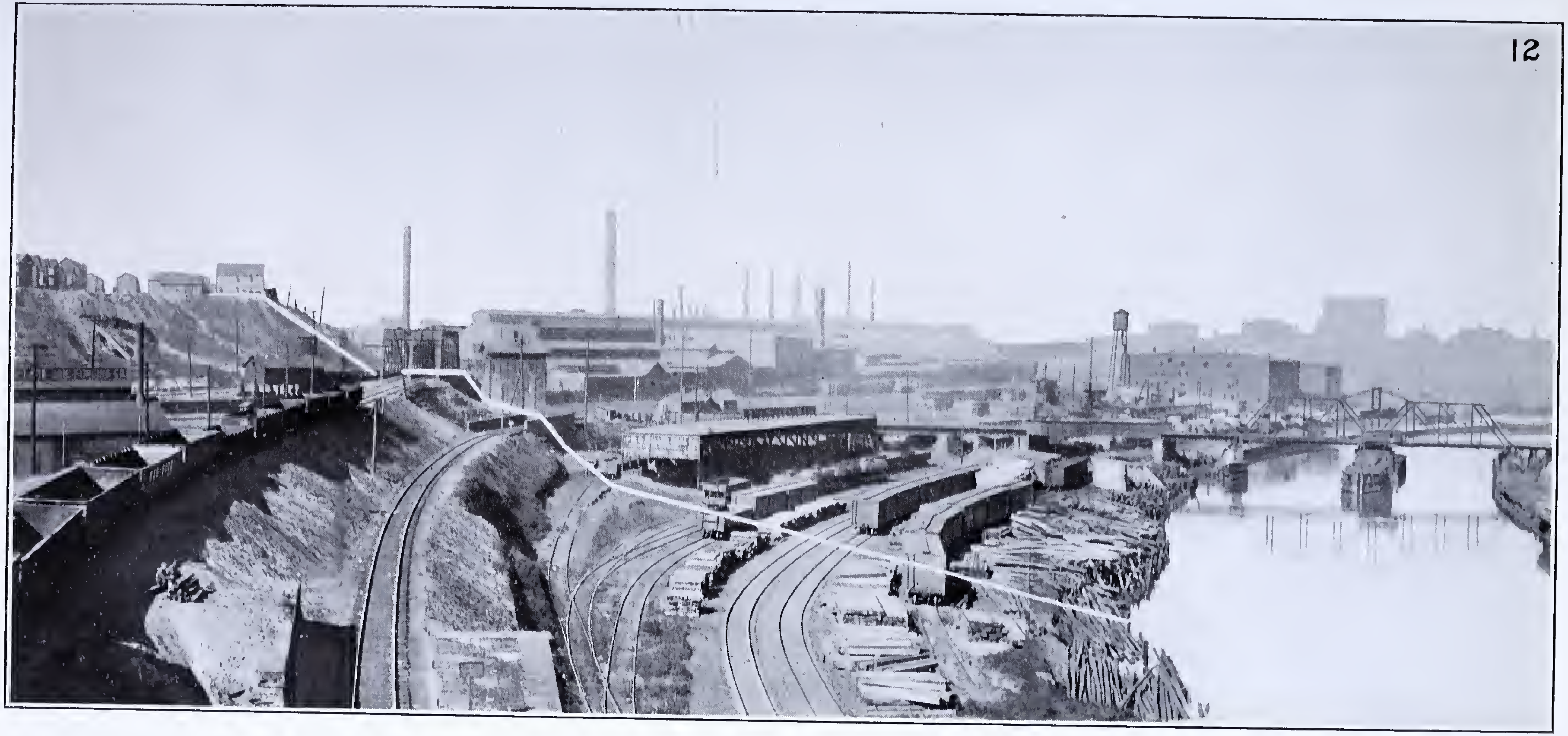

Mahoning Ave.
Central Viaduct
American Steel & Wire Co. Central Furnace Docks



10

11


Upper C.C.C. & ST. L. R. R. Bridge.
Erie R. R. Bridge over C. C. C. & ST. L. R. R.
Lorain Ave. Hill
Upson Nut Co.



12

APPENDIX ACCOMPANYING REPORT OF JUNE 29, 1912, BY COL. JOHN MILLIS, CORPS OF ENGINEERS, UPON SURVEY AND ESTIMATE OF COST OF IMPROVING CUYAHOGA RIVER, OHIO.

INDEX.

Page.
List of parcels of property in vicinity of Cuyahoga River 23
Tabulation showing use of river front and inner harbor, east and west sides of river 26
List of bridges over Cuyahoga River 29
Results of borings in proposed cuts 30
Memorandum showing relation between cut-off channels along river and flood waters 31
Tabulation showing position of Cleveland in population among cities of the United States, 1850–1910 33
Tabulation showing growth of Cleveland manufactures in recent years, compiled from United States census reports 33
Statement of the principal lines of industry in Cleveland (information furnished by Cleveland Chamber of Commerce) 34
Commercial statistics, Cleveland Harbor, calendar year 1911 34
Resolution relative to the survey adopted by the city council August 22, 1910, and approved by the mayor August 26, 1910 35
Communication relative to the survey from the Cleveland Chamber of Commerce, dated August 17, 1910 36
Resolutions by the board of directors, Cleveland Chamber of Commerce, transmitted with the above 36
Communication relative to the survey from the Cleveland Engineering Society, dated August 19, 1910 37
Tabular statement showing totals to date of expenditures by the Federal Government and by local interests, respectively, at the more important harbors on the Great Lakes 54

List of parcels of property in the vicinity of the Cuyahoga River.

[Numbers refer to those appearing on maps.]

Parcel.	Location.	Owner.	Valuation.
1	423 feet frontage on West River Street	Real Estate & Improvement Co. of Baltimore.	$1,370
2	199.4 feet on West River Street, 180 feet on Sycamore (Block).	Cleveland Electric R. R. Co	......
3	Bounded by Sycamore Street and river	City of Cleveland	......
4	Fronting Washington Street	do	......
5	60 feet frontage on Washington Street	Norcross Co	4,470
6	121¼ feet frontage on Washington Street	Mary Breed	9,040
7	116 feet 1 inch frontage on Merwin Street	C. T. & V. R. R	......
8	95 feet 6 inches frontage on Merwin Street	Mary Perkins Lawton	12,680
9	50 feet frontage on Merwin Street	John Monson	7,710
10	do	R. T. Lyon, J. E. Hall, and N. J. Booth	12,630
11	84 feet frontage on Merwin Street	City Ice Co	9,900
12	42 feet frontage on Merwin Street	Case Fish Co	12,630
13	32 feet frontage on Merwin Street	Ralph Worthington	7,170
14	89 feet 1½ inches frontage on Merwin Street	P. W., A. F., and M. C. Harvey	25,220
15	62 feet ½ inch frontage on Merwin Street	Mary A. Farnum	7,280
16	32 feet on Baltimore & Ohio right of way	C. W. & J. L. Cross	3,710
17	82 feet 8 inches on West Avenue	C., T. & V. R. R	......
18	40 feet on West Avenue	Danl. Connolly	6,190
19	308 feet 11 inches on West Avenue	Real Estate & Improvement Co. of Baltimore.	32,000
20	55 feet 3½ inches on Merwin Street	Ellen C. Beckwith	11,400
21	39 feet 3½ inches on Merwin Street	Chas. H. Evers	5,440
22	26 feet 8 inches on Merwin Street	Mary A. Farnum	4,620
23	52 feet 4 inches on Merwin Street	Jacob Weiskopt	9,930
24	44 feet on Merwin Street, tapering back	I. M., E. L., L. G., W. V., A. F. Meyer	2,970
25	50 feet on Merwin Street, 105 feet 4 inches on Center Street.	Sophy Cohen and Edna Goldsoll	12,410
26	159 feet 6 inches on West Avenue	D. Connelly Boiler Co	21,070
27	87 feet 4½ inches on Center Street	Mary A. Farnum	17,440
28	50 feet on Center Street	John Faust	4,720
29	25 feet on Center Street	Jas. Kelley	2,310
30	do	Jas. Rose	4,080
31	15 feet on Center Street	Louisa R. Pearce	10,800
32	47 feet 6 inches on Center Street	John Faust	4,260
33	45 feet on Center Street, 32 feet 6 inches on West Avenue.	H. E. & H. P. Brooks	12,780

List of parcels of property in the vicinity of the Cuyahoga River—Continued.

Parcel.	Location.	Owner.	Valuation.
34	65 feet on Center Street, 100 feet on West Avenue.	Cleveland Trust Co	$22,460
35	25 feet on Center Street	Peter Gerlach	5,550
36	89 feet 2 inches on Center Street, 50 feet on West Avenue.	Lakeside Hospital	9,770
37	50 feet on Center Street, 50 feet on West Avenue.	Cleveland Homeopathic Hospital Society	5,500
38	54 feet 5½ inches on Center Street, 37 feet 4 inches on West Avenue.	Bertha Webber	3,100
39	Wedge, Center and Leonard Streets	Wm. Kramer	6,400
40	About 25 feet on Center Street	L. Schlather	1,740
41	About 28 feet on Center Street	C. & S. Brau	3,240
42	About 90 feet on Fall Street, 65 feet on Center Street.	H. F. and A. M. Clark	7,680
43	About 80 feet on Leonard Street	M. A. P. Draper	3,510
44	About 20 feet on Fall Street	G. H. Warren	1,170
45	About 25 feet on Fall Street through to Leonard Street.	H. P. and M. A. Clark	3,280
46	Wedge, Fall and Leonard Streets	M. A. P. Draper	3,080
47	About 80 feet on Center Street (most of block).	Bowler Foundry Co	33,250
48	About 90 feet on Center Street	Isaac Grodin	12,110
49	Block, Fall and Winter Streets	Bowler Foundry Co	35,660
50	About 100 feet on Leonard, corner of Fall Street.	M. A. P. Draper	12,980
51	About 50 feet on Leonard Street, through to alley.	Peter Gerlach	16,750
52	About 80 feet on Leonard Street, 80 feet on Winter Street.	A. E. Stahl	15,000
53	Wedge, Winter Street and Columbus Road	Peter Gerlach	5,540
54	About 160 feet on Winter Street, through to Columbus Road.	Wm. A. Foss	24,790
55	Fronting Leonard, Winter Streets, and Columbus Road.	D. R. Hilliard	8,950
56	Wedge, Leonard Street and Columbus Road.	S. C. Gaylord	13,730
57	Corner Center Street and Columbus Road	C. T. & V. R. R	3,510
58	370 feet on Columbus Road	do	82,290
59	About 180 feet on Columbus Road	Real Estate & Improvement Co. of Baltimore.	11,640
60	25 feet on Columbus Road to 50 feet on river.	City of Cleveland	....
61	River and Cleveland, Cincinnati, Chicago & St. Louis right of way.	W. H. Averill and Mary S. Bradford, lease No. 201.	53,390
62	River and Erie right of way	Florence W. Chambers	53,300
63	Wedge between Big Four and Erie R. R. tracks.	W. H. Averill and Mary S. Bradford, part of lease No. 202.	21,750
[1] 64	167.33 feet on Carter Road	Averill and Bradford, lease No. 291	11,200
65	130 feet on Carter Road	Averill and Bradford, lease No. 290	18,660
66	312.10 feet on Carter Road	Averill and Bradford, lease No. 289	30,480
67	130 feet on Carter Road	Averill and Bradford, lease No. 288	12,620
68	209.67 feet on Carter Road	Averill and Bradford, lease No. 287	28,350
69	357 feet on Scranton Road	Averill and Bradford, lease No. 292	55,760
70	79.5 feet on Scranton Road	Averill and Bradford, lease No. 296	4,020
71	62.1 feet on Scranton Road	Averill and Bradford, lease No. 298	7,610
72	On Big Four right of way	Averill and Bradford, lease No. 295	8,480
73	Interior of tract	Averill and Bradford, lease No. 294	5,240
74	do	Averill and Bradford, lease No. 293	16,540
75	do	Averill and Bradford, lease No. 297	12,230
76	110 feet on Scranton Road	Averill and Bradford, lease No. 263	9,110
77	109 feet 9 inches on Scranton Road	Averill and Bradford, lease No. 262	8,540
78	50-foot tract, Scranton Road	Averill and Bradford, lease No. 261	26,150
79	100 feet on Scranton Road	Averill & Bradford, lease 260	22,480
80	110 feet 6 inches on Scranton Road	Averill & Bradford, lease 221	47,610
[2] 81	Between Scranton Road and river	Averill & Bradford	16,800
82	On river near Cincinnati Slip	Big Four R. R., $12,000 per acre	1,800
83	do	do	20,640
84	241 feet 10 inches on Merwin Street	Booth Fish Co	45,100
85	25 feet on Merwin Street	G. W. McQuigg	3,640
86	do	S. C. Gaylord	2,500
87	100 feet on Merwin Street	Cleveland Milling Co	17,72
88	216 feet on Merwin Street	do	69,93
89	75 feet on Merwin Street	Delia R. Hilliard	7,48
90	do	S. C. Gaylord	7,50
91	100 feet on Merwin Street	Laura W. Hilliard	12,79
92	200.5 feet on Merwin Street	City Ice Delivery Co	88,60
93	119.03 feet on Merwin Street	John R. Howells	27,34
94	54 feet on Merwin Street	Stowe-Fuller Co	16,36
95	125 feet on Merwin Street	Union Elevator	29,07
[3] 96	About 580 feet on Merwin Street	Big Four R. R	140,90
97	247.08 feet on Merwin Street	Kling Realty Co	44,58
98	100 feet on Merwin Street	Prosse Lumber Co	14,13

[1] Parcels 64–80, inclusive; land value, $153,930. Additional value due to buildings of various lessees.

[2] Land value, $12,000 the acre, leased to Erie R. R.

[3] Of the above value of parcel 96, $12,000 is assessed on buildings and dock of Buffalo Transit Co.

List of parcels of property in the vicinity of the Cuyahoga River—Continued.

Parcel.	Location.	Owner.	Valuation.
99	100 feet on Merwin Street	M. A. P. Draper	$14,260
100	50 feet on Merwin Street	Sigmond Lederer	6,460
101	Triangle apex on Merwin Street	City of Cleveland	....
102	On river near Columbus Street Bridge	Erie R. R.	....
103	About 330 feet on West Twenty-fifth Street	N. Y., P. & O. R. R. Co	24,130
104	About 335 feet on West Twenty-fifth Street	Erie Land & Improvement Co	4,510
[1] 105	Erie R. R. right of way, 50 feet wide	....	....
106	Small corner of Upson Nut Co. ground	....	....
107	About 150 feet on West Twentieth Street, 155 feet on West Twenty-fifth Street.	N. Y., P. & O. R. R. Co	420
108	3.39 acres along Erie R. R. right of way	Averill & Bradford	10,190
109	90 feet on Lorain Avenue	Erie Land & Improvement Co	1,720
110	30 feet on Lorain Avenue	Anton Budzinsky	1,490
111	do	Louisa Morgan	1,110
112	50 feet on Lorain Avenue	James and Katherine Eizmar	2,070
113	40 feet on Lorain Avenue	Nicholas Sweeney	920
114	do	Andrew O'Connell	1,420
115	do	Ellen Costello	1,380
116	do	Chas. Tilles	750
117	20 feet on Grove Court	G. and A. Zamaites	1,190
118	do	G. A. Zamaites	
119	40 feet on Lorain Avenue	Katharina Dribrasky	1,320
120	do	L. and Anni Rolofski and A. and Kattie Firg.	2,510
121	31 feet 4 inches on West Seventeenth Street	Gund Brewing Co	1,270
122	33 feet 8 inches on West Seventeenth Street	James A. Smith	840
123	33 feet on West Seventeenth Street	H. and G. Chapman	1,190
124	30 feet on West Seventeenth Street	Johanna Brasch	1,290
125	do	M. and E. Henzey	650
126	do	Peter and Mary Oppy	290
127	10 feet on West Seventeenth Street	Averill and Bradford	100
128	Along Erie R. R. and Big Four R. R. tracks.	do	12,530
129	60 feet on Lorain Avenue	Elizabeth Swortwood	3,150
130	do	Herman Dietzel	2,020
131	do	Amalia Dietzel	3,310
132	40 feet on West Seventeenth Street	Geo. Young	1,150
133	10 feet on West Seventeenth Street	Geo. Dietz	900
134	20 feet on West Seventeenth Street	Danl. and W. Gorey	
135	30 feet on West Seventeenth Street	Adam Pocukonius	990
136	do	Adam and Ursula Pocukonius	1,100
137	41 feet 8 inches on West Seventeenth Street	Elizabeth and Evan Davis	830
138	20 feet on West Eighteenth Street	Jas. and Jos. Ulbris	920
139	30 feet on West Eighteenth Street	Elizabeth Faulkabar	1,500
140	12 feet on West Eighteenth Street	Jacob and A. Pfatak	990
141	12 feet 1 inch on West Eighteenth Street	Mike and Mary Pfatak	680
142	Big Four R. R. right of way	....	16,800
143	On river	Averill and Bradford	10,000
144	do	Erie Railroad Co	17,000
145	On river near Mahoning Avenue	C. & M. V. R. R. Co	[2] 8,000
146	Between Cuyahoga Avenue and river	Sherwin-Williams Co	88,800
147	Between Mahoning, West Fourth, and Cuyahoga Avenues.	S. S. Stone $\frac{9}{10}$, nine others each $\frac{1}{90}$	59,000
148	Between West Third, Mahoning, West Fourth, and Cuyahoga Avenues.	Peck, Stowe & Wilson	155,840
149	Mahoning Avenue	J. Perkins, leased to N. Y., P. & O. R. R	....
150 151	300 feet on West Third Street	Christopher Doster	21,750
152	17 feet on West Third Street, 166.10 feet on Mahoning Avenue.	Leonard Schlather	10,730
153	297.94 feet on Mahoning Avenue	Lillie Stone	19,700
154	160.2 feet on Mahoning, widening back	do	82,000
155	On river, near Mahoning Avenue	Wheeling & Lake Erie Ry	10,000
156	With parcel 158, about 800 feet on Mahoning Avenue.	Jane Brandstetter	37,060
157	About 60 feet on Mahoning Avenue	C. C. Needham	2,720
158	See parcel 156.		
159	On river and Erie R. R. right of way	Jane Brandstetter	72,240
160	On river	Cleveland Furnace Co	....
61	do	Cleveland Paper Manufacturing Co	....
62	do	Guardian Trust Co	....
63	On N. & S. S. R. R. tracks	do	....
64	On river	Cuyahoga Valley Realty Co	....
65	do	Cleveland Tannery Co	....
66	do	E. Foster	....
67	do	John L. Stadler	....
68	do	Aug. W. Stadler	....
69	do	Benjamin Rose	....
70	do	Kessler Co	....

---

[1] Value not estimated, as it is planned to exchange for a 50-foot strip farther uphill.

[2] Estimated at $12,000 per acre.

Use of river front and inner harbor, Cleveland.

EAST SIDE OF RIVER.

Owner.	Present user.	Feet front.	Used for—
United States Government	Pennsylvania R. R. Co.	1,160	Miscellaneous freight.[1]
L. S. & M. S. R. R. Co.	L. S. & M. S. R. R. Co.	100	Right of way.
City of Cleveland	Not used	190	
Johnson R. Co.	Johnson R. Co.	120	
W. F. Otis	Not used	115	
J. P. and E. P. Chamberlain	Auto Boat Co.	200	Mooring vessels.
J. J. Shepherd	G. L. Towing Co.	120	Do.
Do	Eastland passenger dock	120	Passenger dock.
Ranney Fish Co.	Ranney Fish Co.	115	Fish dock.
O. Perkins		40	Ferry.
City of Cleveland	City of Cleveland	40	Main Avenue Bridge.
O. Perkins	G. L. Towing Co.	200	Mooring vessels.
W. J. Farasey		125	Package freight.
A. W. Chadwick	Not used	44.7	
Richard Winslow		44.3	Marine supplies.
E. N. Winslow		44.3	Ship supplies.
W. G. and K. Winslow	C. & B. Transit Co.	44.2	Storehouse.
C. & B. Transit Co.	do	203	Storage, freight and passenge dock.
Upson Walton Co.		109	Ship supplies.
D. & C. Navigation Co.	Not used	45	
Do		30	Do.
City of Cleveland	City of Cleveland	70	St. Clair Avenue.
D. & C. Navigation Co.	D. & C. Navigation Co.	445	Freight storage and passengers
City of Cleveland	City of Cleveland	125	Superior Avenue and moorin for fire boat.
Hitchcock & Wilcox		240	
B. & O. R. R. Co.	B. & O. R. R. Co.	125	Bridge.
Mary P. Lawton		75	Fish dock.
John Monson		50	
Lyon, Hall & Booth	Case Fish Co.	50	
Independent Ice Co.	do	84	Do.
Henry Harvey	No particular use	42	
Ralph Worthington		32	
H. and M. C. Harvey		135	
City of Cleveland	City of Cleveland	70	Center Street Bridge.
Booth Fisheries Co.	Booth Fisheries Co.	200	Fish dock.
G. M. McQuigg	Not used	25	
S. C. Gaylord	do	25	
Cleveland Commercial Milling Co.	Cleveland Commercial Milling Co.	100	Grain dock.
City of Cleveland	City of Cleveland	40	German Street.
Cleveland Commercial Milling Co.	Cleveland Commercial Milling Co.	216	Grain dock.
D. R. Hilliard		75	Lumber dock.
S. C. Gaylord		75	Do.
City of Cleveland	City of Cleveland	40	French Street.
L. W. Hilliard		100	Lumber dock.
City Ice Delivery Co.	City Ice Delivery Co.	230	Ice dock.
J. R. Howells		120	Sand dock.
Do		70	Plaster mill.
Stowe-Fuller Co.	Stowe-Fuller Co.	85	Cement warehouse.
Union Elevator Co.	Union Elevator Co.	135	Grain dock.
C., C., C. & St. L. R. R. Co.	Kelley Island Lime & Transport Co.	200	Not used.
Do	C. & B. Transit Co.	370	Freight house.
King Realty Co.		250	Sand dock.
C., F., and E. Prosse	Prosse Lumber Co.	100	Lumber and fish dock.
M. A. P. Draper	Not used	100	
S. Lederer	do	50	
City of Cleveland	City of Cleveland	240	Columbus Road and bridge.
A. Muelhausen		145	Fish dock.
S. C. Gaylord		46	Lumber dock.
City of Cleveland		230	
H. and A. Clarke		55	
G. H. Warren		160	
City of Cleveland	City of Cleveland	50	Girard Street.
Do		55	Lumber dock.
J. R. McQuigg		65	
L. W. Hilliard		53	
H. and A. Clark		53	
Gabriel & Dittrick		85	House.
City of Cleveland	City of Cleveland	30	Voltaire Street.
F. Zimmerman	F. Zimmerman Frame & Molding Co.	290	Lumber dock.
J., C., and S. Hay, and S. Mather		90	
C., C., C. & St. L. R. R. Co.	C., C., C. & St. L. R. R. Co.	50	Bridge.
City of Cleveland	B. & O. R. R. Co.	50	Retaining wall for B. & O.
Real Estate & Improvement Co. of Baltimore.	do	150	Do.
B. & O. R. R. Co.	do	215	Do.
Do	do	600	Transfer dock.

---

[1] Occupied under authority of act of Congress of Aug. 14, 1876, and permits granted by the Secretar War in conformity thereto.

Use of river front and inner harbor, Cleveland—Continued.

EAST SIDE OF RIVER—Continued.

Owner.	Present user.	Feet front.	Used for—
C., C., C. & St. L. R. R. Co	C., C., C. & St. L. R. R. Co	100	Bridge.
B. & O. R. R. Co	B. & O. R. R. Co	280	Sand dock.
James Mason		130	Fish dock.
Buckeye Fish Co	Buckeye Fish Co	107	Do.
Sherwin-Williams Co		340	Buildings.
S. T. Everett, trustee	B. & O. R. R. Co	305	Car storage.
B. & O. R. R. Co	do	325	Do.
City of Cleveland	City of Cleveland	50	West Third Street.
B. & O. R. R. Co	B. & O. R. R. Co	40	Car storage.
Real Estate & Improvement Co. of Baltimore.	do	1,190	Do.
City of Cleveland	City of Cleveland	75	West Third Street.
A. M. Burnett		135	Lumber dock.
. M. Stertevant		500	Do.
. A. Gilchrist		210	Do.
N. and B. Mills		165	Do.
V. and L. Palmer		220	Do.
City of Cleveland		65	Street.
V. T. Palmer		100	Lumber dock.
V. and L. Palmer		100	Do.
., C., C. & St. L. R. R. Co	Not used	435	
		330	Grain dock.[1]
		250	
		300	Sand dock.[1]
		725	
		450	Lumber dock.
		120	N. Y. C. & St. L. R. R. pier.
		185	Lumber dock.
ity of Cleveland	City of Cleveland	100	Central viaduct.
., C., C. & St. L. R. R. Co	Not used	430	
ity of Cleveland	City of Cleveland	50	Street.
V. F. Quayle		885	Lumber dock.
ity of Cleveland	City of Cleveland	70	West Third Street.
leveland Provision Co	Cleveland Provision Co	969	Buildings.[2]
. & O. R. R. Co	B. & O. R. R. Co	500	Retaining wall for railroad.
merican Steel & Wire Co	American Steel & Wire Co	2,315	Furnace dock.
rie R. R. Co.	Erie R. R. Co	100	Right of way.
merican Steel & Wire Co	American Steel & Wire Co	840	Furnace dock.
ity of Cleveland	City of Cleveland	100	Jefferson Street.
. L. Towing Co	G. L. Towing Co	550	Mooring vessels.[3]
tandard Oil Co	Standard Oil Co	775	Works.
. & S. S. R. R. Co	N. & S. S. R. R. Co	90	Right of way.
tandard Oil Co	Standard Oil Co	160	Works.
. & O. R. R. Co	B. & O. R. R. Co	70	Right of way.
rasselli Chemical Co	Grasselli Chemical Co	1,465	Works.
hio State	Ohio State	100	Canal.
iver Furnace Co	Not used	1,672	
ucy Hunter	do	280	
Morgan	do	285	
. F. and H. Eggers	do	260	
ity of Cleveland	City of Cleveland	63	Clark Avenue.
. H. Holly	Not used	325	
rie R. R. Co	Erie R. R. Co	80	Right of way.
ity of Cleveland	City of Cleveland	65	Street.

WEST SIDE OF RIVER.

Owner.	Present user.	Feet front.	Used for—
ity of Cleveland	L. S. & M. S. R. R. Co	680	Fuel dock etc.[4]
. S. & M. S. R. R. Co	do	100	Right of way.
			Old river bed:
Do	G. L. Towing Co	100	Fuel dock.
. & O. R. R. Co	B. & O. R. R. Co	100	Right of way.
ennsylvania R. R. Co	Pennsylvania R. R. Co	7,620	Ore, fuel, and stone docks.[5]
merican Construction Co	American Construction Co	2,060	Mooring vessels; no dock.[5]
merican Ship Building Co	American Ship Building Co	3,400	Yards.[6]
rnelia Young	Not used	400	
ty of Cleveland	City of Cleveland	345	Old waterworks.
Do	do	70	Street.
rie R. R. Co	Erie R. R. Co	2,205	Ore dock.
Do	do	200	Transfer dock.
ty of Cleveland	do	105	Do.
rie R. R. Co	do	80	Do.
ty of Cleveland	do	65	Do.
rie R. R. Co	do	400	Do.
merican Ship Building Co	American Ship Building Co	750	Dry dock.
& O. R. R. Co	B. & O. R. R. Co	1,715	Fuel dock and right of way.[7]

---

[1] Includes Cincinnati Slip.

[2] Fifty feet of this length is pier for W. & L. E. R. bridge

[3] Includes slip.

[4] This frontage included in proposed widening.

[5] Includes slips.

[6] Includes dry docks.

[7] Includes Sycamore Slip.

Use of river front and inner harbor, Cleveland—Continued.

WEST SIDE OF RIVER—Continued.

Owner.	Present user.	Feet front.	Used for—
			Old river bed—Continued.
Real Estate & Improvement Co. of Baltimore.	B. & O. R. R. Co	159	Freight dock.
Do	do	452	Package freight.
City of Cleveland		100	Pipes.
Do	City of Cleveland	90	Main Avenue Bridge.
Do		77	Provisions.
Real Estate & Improvement Co. of Baltimore.	B. & O. R. R. Co	810	Pipes and freight.
City of Cleveland	City of Cleveland	360	Streets, etc.
B. & O. R. R. Co	B. & O. R. R. Co	100	Right of way.
Norcross Bros	Norcross Co	60	Stone dock.
M. E. Breed		122	
City of Cleveland		470	Fish dock and street.
Erie Land & Improvement Co	Erie R. R. Co	635	Coal dock.
Cleveland Ship Building Co	do	110	Car dump.
Erie Land & Improvement Co	do	265	Car dump and retaining wall.
Erie R. R. Co	do	970	Retaining wall for Erie R. R.
City of Cleveland	do	140	Do.
Erie R. R. Co	do	475	Do.
City of Cleveland	do	15	Do.
Erie R. R. Co	do	150	Do.
City of Cleveland	do	15	Do.
Erie R. R. Co	do	180	Do.
City of Cleveland	City of Cleveland	85	Columbus road.
Erie R. R. Co	Erie R. R. Co	135	Retaining wall.
City of Cleveland	do	18	Do.
Erie R. R. Co	do	220	Do.
City of Cleveland	do	66	Do.
Upson Nut Co., one-half	do	28	Do.
Erie R. R. Co., one-half			
Upson Nut Co	Upson Nut Co	1,390	Furnace dock.
C., C., C. & St. L. R. R. Co	C., C., C. & St. L. R. R. Co	40	Spur track.
F. W. Chambers	Cuyahoga Lumber Co	400	Lumber dock.
Averill & Bradford	Potter-Tear Lumber Co	375	Do.
C., C., C. & St. L. R. R. Co	C., C., C. & St. L. R. R. Co	100	Right of way.
Averill & Bradford	Milles-Carleton Lumber Co	1,410	Lumber dock.
City of Cleveland	City of Cleveland	640	Streets and lumber dock.
Averill & Bradford	Erie R. R. Co	2,240	Lumber transfer dock.
C., C., C. & St. L. R. R. Co	C., C., C. & St. L. R. R. Co	30	Spur track.
Averill & Bradford	Erie R. R. Co	260	Lumber transfer dock.
Erie R. R. Co	do	860	Retaining wall.
N. Y. C. & St. L. R. R	N. Y., C. & St. L. R. R	100	Right of way.
City of Cleveland	City of Cleveland	100	Central viaduct.
Erie R. R. Co	Erie R. R. Co	800	Retaining wall.
City of Cleveland	City of Cleveland	50	Mahoning Avenue.
Sherwin-Williams Co	Sherwin-Williams Co	360	Freight dock.
Chris. Doster		250	Lumber dock.
Doster & Rickettson		180	
City of Cleveland	City of Cleveland	70	West Third Street.
E. S. Smith		207	Lumber dock.
L. M. Stone		650	
W. & L. E. R. R. Co	W. & L. E. R. R. Co	165	Right of way and retaining wa
City of Cleveland	City of Cleveland	60	Street.
W. & L. E. R. R. Co	W. & L. E. R. R. Co	1,520	Lumber transfer dock.
City of Cleveland	City of Cleveland	54	Mahoning Avenue.
Jane Brandstetter	W. & L. E. R. R. Co	530	Lumber dock.
Erie R. R. Co	Erie R. R. Co	117	Right of way.
Guardian Trust Co	W. & L. E. R. R. Co	130	Old car dump.
City of Cleveland	do	50	Do.
Guardian Trust Co	do	260	Do.
City of Cleveland	City of Cleveland	50	Nebraska Avenue.
Chas. E. Needham	W. & L. E. R. R. Co	230	Lumber dock.
City of Cleveland	City of Cleveland	60	Jefferson Street.
Cleveland Trinidad Paving Co		115	Lumber dock.
City of Cleveland		275	Do.
Trinidad Paving Co		95	Do.
Chris. Doster		185	Do.
City of Cleveland	City of Cleveland	70	Mary Avenue.
C. T. Yound	Construction company	375	Tool dock.
N. & S. S. R. R. Co	N. & S. S. R. R. Co	185	Right of way.
B. & O. R. R. Co	B. & O. R. R. Co	70	Do.
River Furnace Co	River Furnace Co	235	
City of Cleveland	City of Cleveland	75	Houston Avenue.
River Furnace Co	River Furnace Co	2,590	Furnace dock.
Cleveland Furnace Co	Cleveland Furnace Co	526	Do.
City of Cleveland	City of Cleveland	63	Clark Avenue.
Cleveland Furnace Co	Cleveland Furnace Co	65	
Erie R. R. Co	Erie R. R. Co	85	Right of way.
Cleveland Furnace Co	Cleveland Furnace Co	....	Furnace dock.

Distance above lake.	Location and name.	Kind.	Deck or through.	Width of center pier.	Head-room when closed.	Opening for navigation.			How operated.	Remarks.
						Right.[1]	Center.	Left.[1]		
Miles.				*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*		
0	L. S. & M. S. R. R.	Railway, horizontal pivot	Through	33	6.2	129.5			Steam	Left side, no channel.
0.25	Main Avenue	Highway, horizontal pivot	do	33	12.8	91.7		85.5	do	
.5	Superior Avenue Viaduct	do	Deck	56	40	130			do	Do.
.55	B. & O. R. R.	Railway, rolling lift, single leaf	Through		6.5		160		Electric	Double track.
.63	Center Street	Highway, horizontal pivot	do	50	16	112			do	Left side, no channel.
1.25	Columbus Street	do	do		23.5		112.1		do	Double draw.
1.55	C., C., C. & St. L. Ry. (lower)	Railway, rolling lift, single leaf	do		7.5		107.5		Steam	
1.75	C., C., C. & St. L. Ry. (middle)	do	do		20.5		102.5		do	Double track.
2	Third Street (No. 1)	Highway, horizontal pivot	do	35	22	60.3		64.5	do	Depth under left side, 17 feet.
2.2	Third Street (No. 2)	Highway, rolling lift, double leaf	do		13		116.2		do	
2.62	C., C., C. & St. L. Ry. (upper)	Railway, horizontal pivot	do	35	19.4	66.5		66.5	Gas	Depth under right side, 17 feet.
2.8	N. Y. C. & St. L. Ry	Railway, rolling lift, single leaf	do		39		104		Steam	
2.85	Central Viaduct	Highway, fixed span	do	37	95	73		68		Center span to be removed.
3.15	Third Street (No. 3)	Highway, horizontal pivot	do	34	15.3	68.5		67.2	Hand	Depth under left side, 17 feet.
3.35	W. & L. E. Ry. (No. 1)	Railway, rolling lift, single leaf	do		30.5		110		Electric	
3.85	Erie Ry	do	do		27.2		120		do	Double track.
4.1	Jefferson Avenue	Highway, rolling lift, single leaf	Deck		17		130		do	
4.33	N. & S. S. Ry	Railway, rolling lift, single leaf	Through		8		120		do	
4.35	B. & O. R. R	do	do		10		120		do	
5.3	W. & L. E. Ry. (No. 2)	Railway, horizontal pivot	do	30	30	50		78	do	Right side; no channel.
6.5	W. & L. E. Ry. (No. 3)	Railway, fixed span	do		13.6					
6.6	N. & S. S. Ry. (No. 2)	do	do		13.6					
8.1	W. & L. E. Ry. (No. 4)	do	do		10.5					
9	Dennison-Harvard	Highway, fixed span	Deck							

OLD RIVER BED.

Distance above lake.	Location and name.	Kind.	Deck or through.	Width of center pier.	Head-room when closed.	Right.	Center.	Left.	How operated.	Remarks.
0.13	B. & O. R. R	Railway, rolling lift, single leaf	Through		5		204.3		Electric	
.23	Willow Avenue	Highway, horizontal pivot	do	30	15.2	137			Steam	Left side; no channel.

---

[1] Right and left refer to sides looking downstream.

All bridges are steel.

Results of borings in proposed new channel to determine character of material in conne
tion with Cuyahoga River Survey Report.

Location.	Boring No.	Results.	
Lake Shore Ry. bridge	1	+6.1 to +0.1	Coarse gray sand.
		+0.1 to −5.8	Sandy loam.
		−5.8 to −25.8	Coarse sand.
		−25.8 to −36.8	Stiff blue clay.
Superior Viaduct	2	+6.3 to −6.7	Yellow sand.
		−6.7 to −10.7	Quicksand.
		−10.7 to −19.7	Lake sand.
		−19.7 to −21.7	Gravel.
		−21.7 to −23.7	Quicksand.
		−23.7 to −31.7	Lake sand.
		−31.7 to −34.7	Gravel.
Cut No. 1	3	+7.3 to −0.7	Yellow sand.
		−0.7 to −2.7	Clay.
		−2.7 to −17.7	Quicksand.
		−17.7 to −23.7	River silt.
		−23.7 to −35.7	Quicksand.
Do	4	+7.1 to −2.9	Slag and cinders.
		−2.9 to −13.9	Stiff blue clay.
		−13.9 to −31.9	Dry quicksand.
		−31.9 to −33.9	River silt.
Cut No. 2	5	+6 to +1	Fill.
		+1 to −5	Yellow sandy loam.
		−5 to −10	Dry quicksand.
		−10 to −19	Blue clay—fine sand.
		−19 to −24	Fine lake sand.
		−24 to −33	Yellow clay with fine sand.
		−33 to −35	Yellow clay with a little gravel.
Do	6	+8.3 to +3.3	Fill.
		+3.3 to −0.7	Yellow clay with a little fine sand
		−0.7 to −6.7	Yellow clay.
		−6.7 to −13.7	Blue clay and sand.
		−13.7 to −19.7	Quicksand.
		−19.7 to −21.7	Lake sand.
		−21.7 to −24.7	Gravel.
		−24.7 to −33.7	Quicksand.
Do	7	+10.8 to +5.8	Fill.
		+5.8 to +1.8	Yellow clay and fine sand.
		+1.8 to −6.2	Yellow clay.
		−6.2 to −35.2	Blue clay.
Upson Nut Co. cut	8	+40 to +21	Fine sand.
		+21 to +18	Wet sand with a little loam.
		+18 to +7	Quicksand.
		+7 to −37	Stiff blue clay.
Do	9	+27.7 to +11.7	Fine yellow sand.
		+11.7 to −0.3	Wet yellow sand.
		−0.3 to −12.3	Blue clay with fine sand.
		−12.3 to −35.3	Stiff blue clay.
Mahoning Avenue cut	10	+9.5 to +4.5	Fine gray sand.
		+4.5 to −19.5	Lake sand.
		−19.5 to −32.5	Stiff blue clay.
Do	11	+10.7 to +6.7	Sandy loam.
		+6.7 to −2.3	Stiff yellow clay.
		−2.3 to −3.3	Stiff blue clay.
		−3.3 to −11.3	Sandy loam mixed with clay.
		−11.3 to −35.3	Plastic blue clay.
Do	12	+8.5 to +2.5	Sandy loam with yellow clay.
		+2.5 to −1.5	Wet yellow sand mixed with y low clay.
		−1.5 to −5.5	Fine gray sand mixed with clay.
		−5.5 to −29.5	Lake sand, wet.
		−29.5 to −39.5	Dry quicksand.
Upper River improvement	13	+9 to +1	Clay.
		+1 to −10	Fine wet sand.
		−10 to −15	Fine lake sand.
		−15 to −21	Stiff blue clay.
Do	14	+9 to 0	Clay.
		0 to −11	Clay and sand.
		−11 to −21	Stiff blue clay.
Do	15	+9 to +1	Clay.
		+1 to −10	Lake sand.
		−10 to −22	Blue clay.
Do	16	+9 to −1	Fine sand.
		−1 to −7	Fine sand and loam.
		−7 to −19	Coarse sand.
		−19 to −27	Blue clay.
Do	17	+9.2 to +4.5	Fine sand.
		+4.5 to −4.5	Coarse lake sand.
		−4.5 to −8.5	Dry quicksand.
		−8.5 to −15.2	Stiff blue clay.

esults of borings in proposed new channel to determine character of material in connection with Cuyahoga River Survey Report—Continued.

Location.	Boring No.	Results.	
pper River improvement	18	+10.6 to +3.5	Wet yellow sand.
		+3.5 to −8.5	Wet gray sand.
		−8.5 to −16.5	Stiff blue clay.
Do	19	+12 to +6	Fine sand and loam.
		+6 to −1	Fine gray sand.
		−1 to −7	Wet lake sand.
		−7 to −15	Stiff blue clay.
Do	20	+13.6 to +9.8	Sandy loam.
		+9.8 to +6.8	Fine wet sand.
		+6.8 to −6.2	Stiff blue clay.
Do	21	+75 to +71	Dry sand.
		+71 to +59	Sandy loam.
		+59 to +47	Quicksand and blue clay.
		+47 to +42	Sand and gravel.
Do	22	+10.5 to +5.5	Clay.
		+5.5 to +0.5	Fine wet sand.
		+0.5 to −2.5	Quicksand.
		−2.5 to −12.2	Stiff blue clay.
Do	23	+10.5 to +4.5	Clay.
		+4.5 to −2.5	Sandy loam.
		−2.5 to −15.5	Coarse sand.
		−15.5 to −20.5	Stiff blue clay.
Do	24	+10 to +0.5	Yellow sandy loam.
		+0.5 to −6.5	Fine wet sand.
		−6.5 to −8.8	Fine dry sand.
		−8.8 to −28.5	Coarse sand and gravel.
Do	25	+10 to +3	Yellow sandy loam.
		+3 to −7.8	Blue sandy loam.
		−7.8 to −24.8	Wet lake sand.
Do	26	+10 to +6	Yellow sandy loam.
		+6 to 0	Fine dry sand.
		0 to −4	Sandy loam.
		−4 to −21	Coarse sand and gravel.
		−21 to −24	Sand, gravel, and blue clay.
		−24 to −28	Stiff blue clay.

[Memorandum by Gurley S. Phelps, junior engineer.]

LATION BETWEEN CONTEMPLATED CUT-OFF CHANNELS ALONG CUYAHOGA RIVER AND FLOOD WATERS.

1. The flood of January, 1904, is used for the discussion because the data of slope ad discharge are reliable, and because the high water was not caused by ice gorges. I 1884 the water went considerably higher than in 1904, but probably because o gorges and the fact that at that date the river depth was much less and consequently t area of cross section less.

2. In 1904 flood:

Maximum discharge, 27,800 cubic foot-seconds.

Mean slope (B. & O. bridge below weigh lock to the lake, 4.6 miles)=3.2 foot-miles.

Ganguillet & Kutter formula:

V=C RS where V=mean velocity, foot-seconds.
C=*a* constant.
R=mean hydraulic radius.
S=slope.

R=16
pproximately C=80
S=3.2 foot-miles=0.0006.

$V=80\sqrt{16(0.0006)}=7.84$ foot-seconds, giving 10.5 foot-seconds surface velocity. (& K.)

lean area cross section$=\frac{27,800}{7.84}=3,540$ square feet, which about represented dition at that time.

urface velocity 10.5 foot-seconds=7.2 miles per hour.

n report of Maj. Dan C. Kingman on this flood, velocity is quoted as 10 miles per r, but this must have been at points of less than average section.

bserved rise of water, Baltimore & Ohio bridge, 14 feet.

Lake elevation at the time, 570.8 (2 feet below mean lake level).

Elevation flood at Baltimore & Ohio bridge, 584.8.

Elevation Ohio Canal, weigh lock to 5-mile lock, 586.5.

Above the Baltimore & Ohio bridge conditions during the flood are not recorde except that the valley was overflowed, consequently the slope was probably le than below the bridge.

3. Condition under a similar flood with cut-off improvements made:

Discharge, 27,800 cubic foot-seconds.

Mean sectional area, 4,200 square feet. $V=\frac{27,800}{4,200}=6.57$ foot-seconds.

$6.57=80\sqrt{17.3\,S}$ $R=17.3$

$S=0.0004$ $C=80.$

Distance, lake to Baltimore & Ohio bridge, 4.6 miles, 24,300 feet.

Rise to be expected at Baltimore & Ohio bridge, assuming cut-off channels carry a water, as follows:

Mahoning Avenue, cut shortens distance 1,400 feet.
Plan No. 1 (cuts 1 and 2) shortens distance 7,000 feet.
Plan No. 2 (Upson Nut cut) shortens distance 5,700 feet.
Plan No. 1 shortens distance 8,400 feet.
Plan No. 2 shortens distance 7,100 feet.
Plan No. 1, distance lake to Baltimore & Ohio bridge, 16,900 feet.
Plan No. 2, distance lake to Baltimore & Ohio bridge, 18,200 feet.
Expected slope, 0.0004.
Expected rise, plan No. 1, 6.8 feet.
Expected rise, plan No. 2, 7.3 feet.
Rise in 1904 was 14 feet.

The rise at Baltimore & Ohio bridge would thus be about 7 feet less than it wa in 1904, with the same discharge, and the river would remain within its banks to point much farther upstream.

If flood occurred with lake at mean lake level, 572.8, water elevation at Baltimor & Ohio bridge would be about 580, or 6½ feet below the level in canal at weigh lock

4. Upper river improvement, Baltimore & Ohio bridge to Denison Avenue turnin basin:

	Feet.
Length old channel	17,000
Upper river improvement reduces this	4,500
Length improved channel	12,500

Flood area of section, 5,600 square feet.

$V=\frac{27,800}{5,600}=4.97$ foot-seconds. $R=21.8.$

$C=85.$

$V=4.97=85\sqrt{21.8\,S}$ $S=0.000164$

Even if S should be 0.0002, rise would be 2.5 feet from Baltimore & Ohio bridge turning basin, or elevation at turning basin would be 582.5, which is 3½ feet belo canal level, and the banks of the river would not be overflowed to that point.

5. It is thought that turning basin at upper end of upper river improvement woul catch a great deal of sediment at time of flood, and depth would only be maintained i this basin by frequent dredging.

6. The height of flood water depends upon the slope necessary to produce velocit sufficient to carry the volume of water to be discharged.

$V-C\sqrt{RS}$. The quantities C and R are not constants, but the variation in them small, and roughly, V varies with $\sqrt{S}$; thus, to double the velocity, the slope must multiplied by 4. Decreasing velocity even slightly produces a large reduction slope and consequent height of floods.

The new channels will have larger sectional area, and the constant tendency is increase this area, thus reducing the velocity of flood current and reducing the flo height even more rapidly.

7. Several considerations have been omitted from above, such as the effect straightening the bends to reduce friction and thus lower S, and the effect of the o channels carrying part of flood water, also reducing S, and effect of bridge piers ar restricted sections to increase S. It is thought that these items will tend to balan each other.

8. The tendency to form ice gorges is continually decreasing, due to greater channel depth, greater bridge spans, and more complete breaking up of ice in lower rivers, so that a flood of much greater volume than 1904 is not probable.

9. The effect of the improvement would be to materially decrease the height of flood waters, and the improvement would not be in danger of damage from that source.

(July 18, 1912.)

Position of Cleveland in population among cities of the United States, 1850–1910.

	Position.	Population.
1850	Forty-third	17,034
1860	Twenty-first	43,417
1870	Fifteenth	92,829
1880	Twelfth	160,146
1890	Tenth	261,353
1900	Seventh	381,768
910	Sixth	560,663

The following table, compiled from the United States census reports, shows con-isely the growth of Cleveland manufactures in recent years:

	Census 1899.	Census 1894.	Per cent increase 1904–1909.	Census 1909.	Per cent increase 1899–1909.
umber of establishments	1,349	1,616	33	2,148	59
apital	$93,021,316	$156,321,000	45	$227,397,000	144
alaries and wages	$30,073,416	$41,749,000	52	$63,646,000	112
alue of products	$126,156,839	$171,924,000	58	$271,961,000	116
umber of factory employees	57,868	70,917	23	96,968	68

The tabulation below, showing the classes of industries in Cleveland in which there as an increase of more than 100 per cent in value of products from 1900 to 1910, is ompiled from recent census reports and indicates further the range and diversity Cleveland's industries:

Ten-year increases, 1899–1909.

	Per cent in 10 years.
oundry and machine-shop products	103
aints and varnishes	111
obacco manufactures	119
inting and publishing	122
aughtering and meat packing	129
tlery and tools	169
ass and bronze products	176
omen's clothing	204
kery products	210
osiery and knit goods	295

Five-year increases, 1904-1909.

	Per cent in 5 years.
ncy and paper boxes	171
pper, tin, and sheet-iron products	310
tomobiles and automobile parts	365
llinery and lace goods	930

SOME OF THE PRINCIPAL LINES OF INDUSTRY IN CLEVELAND.

[From information furnished by the Cleveland Chamber of Commerce.]

Wire and wire nails, bolts, nuts, and tacks.—The headquarters and seven of th plants of the American Steel & Wire Co. are located at Cleveland, as well as th Upson Nut Co., the National Screw & Tack Co., and many others producing article of this general nature.

Steel steamships.—Cleveland is the headquarters of the American Shipbuilding Co. which produces annually a greater tonnage of steel steam vessels than are launche anywhere else in this hemisphere. One of the shipbuilding and repairing plants o this company is at Cleveland.

Hoisting and conveying machinery.—The Brown Hoisting Machinery Co. and th Wellman-Seaver-Morgan Co. are located here. They have been producers of many o the most successful devices for unloading iron ore, and many other companies her are engaged in a similar line.

Electric carbons and dry batteries.—Cleveland is the headquarters of the Nationa Carbon Co., the principal producer in the United States of electric-light carbons an dry batteries.

Automobiles.—The Winton, Peerless, Stearns, and White gasoline cars and th Baker, Rauch & Lang electric machines are among the well-known makes produce in Cleveland.

Carriage and saddlery, hardware, and automobile parts.—The Cleveland Hardware Co is perhaps the largest drop-forging plant in America, and with many other Clevelan companies produces practically everything that goes into the making of automobiles

Women's outer garments.—Cleveland is second only to New York in the productio of this class of goods.

Paints, oils, and varnishes.—Cleveland was the scene of the establishment of th Standard Oil Co., and now contains the headquarters and some of its principal plants The Sherwin-Williams Co., the largest paint manufacturing institution in the world and the Glidden Varnish Co., the largest varnish manufacturing plant in the world are among the other large companies in these lines.

Incandescent lamps.—Several of the leading lamp manufacturing plants of th General Electric Co. are located in Cleveland, and the experimental laboratory o the National Electric Lamp Association is here.

Castings.—There are 62 foundries of all kinds in Cleveland, making castings o gray iron, malleable iron, steel, brass, and aluminum.

Stoves.—One of the leading plants of the American Stove Co. is here, as well as som large plants manufacturing ranges, and one of the leading oil-stove manufactorie of the world.

COMMERCIAL STATISTICS, CLEVELAND HARBOR, CALENDAR YEAR 1911.

[Season of navigation opened Mar. 13, 1911; closed Dec. 30, 1911.]

Vessel classification.

Classes.	American.	Foreign.	Total.	Net regis tered tonnage.
ENTERING.				
Registered:				
Steamers	3,303	499	3,802	6,339,8
Barges	545	37	582	578,8
Total	3,848	536	4,384	6,918,6
DEPARTING.				
Registered:				
Steamers	3,313	499	3,812	6,313,3
Barges	545	37	582	582,1
Total	3,858	536	4,394	6,895,5

Passengers (partial list), 492,632.

Freight traffic.

Articles.	Amount in customary units.		Amount in short tons.	Valuation.	Average haul or distance freight was carried.	Rate per ton-mile.
	Amount.	Unit.				
ENTERING.					*Miles.*	*Mills.*[1]
Iron ore	4,584,212	Long tons	5,134,317	$16,944,416	740	0.8
Lumber	122,807,352	Feet b. m	184,211	2,583,332	500	1.6
Laths	41,210,050	Pieces	12,330			
Posts	8,896	....	133			
Pulp wood	2,440	Cords	6,100			
Oil	130	Barrels	24	480	120	....
Grain	3,306,591	Bushels	81,607	3,032,502	750	.59
Cement	34,500	Barrels	6,900	34,500	280	....
Copper ore	447	Short tons	447	134,100	175	....
Stone:						
Flux	114,825	do	114,825	114,825	60	....
Building	228,482	do	228,482	114,241	60	....
Manufactured iron	5,264	do	5,264	210,560	175	....
Coal	810	do	810	2,430	57	....
and and gravel	81,860	Cubic yards	141,017	43,670	....	....
ulphur ore	3,100	Short tons	3,100	13,950	712	....
ish	7,238,217	Pounds	3,619	217,140	....	....
iscellaneous	....	....	99,769	5,986,140	200	....
Total	....	....	6,022,955	29,432,286	....	....
DEPARTING.						
oal:						
Cargo	4,135,213	Short tons	4,135,213	9,304,079	635	.54
Bunker	243,783	do	243,783	548,511	....	....
umber	90,482	Feet b. m	135	5,047	712	1.6
il	48,410,882	Gallons	180,000	2,160,000	262	....
rain	100,000	Bushels	2,220	50,000	175	.59
anufactured iron	235,851	Short tons	235,851	9,434,040	702	....
iscellaneous	....	....	129,603	7,776,180	657	....
Total	....	....	4,926,805	29,277,857	....	....

---

[1] Approximate only; impracticable to obtain figures for other items.

esolution adopted by the council of the city of Cleveland August 22, 1910, and approved by the mayor August 26, 1910.]

hereas the council of the city of Cleveland recognizes the value of the upper valley of the Cuyahoga River as an increasingly important industrial and terminal center to which is brought lake commerce and from which the same can be extended throughout the Ohio Canal; and

hereas this council has already made such industrial center more accessible to navigation by recently extending the navigable channel of the Cuyahoga River and by straightening and widening and otherwise improving it within the last four decades at a total expenditure of over $3,000,000, and has aided the enactment of legislation by the General Assembly of the State of Ohio which more fully authorized councils o improve rivers and watercourses within municipal corporations; and

hereas this council desires further improvement of the Cuyahoga River and on July 1, 1910, pledged its cooperation with the United States Government in providing ways and means of further improving the river, having in view the United States iver and harbor act of 1910; and

ereas it is the judgment of this council that a complete survey of the Cuyahoga River must be made, as authorized in said river and harbor act, before any comprehensive proposition can be submitted to the United States Government, either by he Government engineers or by this council, which would form a definite basis for uch cooperation: Therefore be it

esolved by the council of the city of Cleveland, State of Ohio, That the United State, ineer in charge of the harbor works in the Cleveland district be, and he is herebys uested to report, as authorized in the aforesaid river and harbor act, that a detailed vey of the Cuyahoga River, from its mouth to a more southerly connection with Ohio Canal, is necessary in order that a report may be made, as required in the esaid river and harbor act, upon a definite proposition for cooperation by the city leveland; and

esolved, That the city clerk transmit a copy of this resolution to the engineer in ge of the said harbor district.

EAL.]

R. T. McCRAY, *City Clerk.*

LETTER OF THE CLEVELAND CHAMBER OF COMMERCE.

Cleveland Chamber of Commerce,
August 17, 1910.

Dear Sir: As representing to a large extent the sentiment of the business interest of Cleveland, the board of directors of the Cleveland Chamber of Commerce, actin on the recommendation of its river and harbor committee, transmits herewith resolutions to which your attention is respectfully invited. In so doing we desire also t present for your consideration the following statement:

The language of the river and harbor act of 1910 in relation to the Cuyahoga Rive survey implies that the river is considered as an integral part of the channel fron Lake Erie to the Ohio River by way of the Ohio Canal; and such, in fact, the rive always has been since the completion of the canal. We desire to point out further however, that the river bears a close analogy to the Black Rock Channel at Buffalo which the Government is improving, in that it is, like that channel, not only a portio of a through artificial waterway, but also a channel leading primarily to a large industrial center. We desire also to point out that in other places on the Great Lakes wher large improvements have been made by the National Government in inner harbor and rivers, notably in the Calumet River at South Chicago, in the Maumee at an above Toledo, and in the St. Louis River at Duluth-Superior, practically no sums hav been expended by the localities affected; whereas in Cleveland the inner harbor o the Cuyahoga River has been improved and maintained for many years at a total cos of upward of $3,000,000, furnished entirely by the city and owners of abuttin property.

The act provides for a report on any proposition for cooperation by any localitie affected by this proposed improvement. You will appreciate the fact that it is impossible for the city of Cleveland to obligate itself at present to any problematical futur expenditures. We desire to express our confident belief that not only the city, bu owners of property in the valley of the river which will be affected by the propose improvements, have every intention and purpose of cooperating with the Government in the expense of making such improvement as may be found advisable an practicable. There is already strong probability that the land required for an extension of the river channel can be given to the Government, or to the city of Clevelan for transfer to the Government. It is also probable that owners of abutting propert will be willing to revet the extended channel where necessary, and thus all of th conditions which were imposed upon the city of Milwaukee as a prerequisite for th improvement of the three rivers emptying into Lake Michigan at that city are alread practically assured in Cleveland, since it is reasonable to assume that the city Cleveland would be quite willing to continue to maintain, as it has in the past, th navigable channel of the Cuyahoga River as improved.

The chief purpose of this communication, however, is to point out the fact that is practically impossible for the city of Cleveland or affected property owners submit, through you, any definite proposition for cooperation, without the defini data regarding the proposed improvement which can be secured by means of th detailed survey requested by the inclosed resolutions.

With such data in hand, we pledge ourselves to make every effort to secure, ar we believe that it will be possible for us to secure, definite proposals of cooperati which will enable you to make such a report as is directed by the river and harbor ac

Very respectfully, yours,

Geo. W. Kinney, *President.*

Col. John Millis, *Corps of Engineers.*

[Resolutions adopted by the Cleveland Chamber of Commerce.]

Whereas the river and harbor act of 1910 provides for a survey of the "Cuyaho River, from its mouth to a more southerly connection with the Ohio Canal, wi a view to eliminating bends and securing a navigable depth of 21 feet, with sui able width; with a report on any proposition for cooperation by localities affect thereby"; and

Whereas the improvement of the Cuyahoga River will be an important improveme of the northern outlet and terminal of the Ohio Canal, now being reconstructed the State of Ohio at a total estimated expense of over $1,000,000, of which appro imately $800,000 has already been appropriated and expended; and the Nation Government is now improving the southern outlet and terminal of the Ohio Can the Muskingum River; and

Whereas the most recent extension by the city of Cleveland of the navigable chan of the Cuyahoga was followed immediately by increased receipts of about 450, tons, all carried to the furnaces of the upper river valley, which increase will grow this year to approximately 750,000 tons; and every extension and improvement of the channel has been anticipated by industrial and commercial development in the river valley; and

Whereas the straightening, widening, and extending of the navigable channel of the Cuyahoga River will render more accessible to lake commerce the already great industrial and terminal center located in the upper valley, and will enlarge and extend that center by making available a large amount of river frontage and adjacent property; and

Whereas on July 11, 1910, the council of the city of Cleveland, by resolution, declared "that in the event of the adoption by Congress of a comprehensive project for the improvement of the Cuyahoga River, it is the judgment of this council that the city of Cleveland should, for the purpose of promoting such improvement, agree to participate with the United States Government in providing ways and means for such improvement"; and

Vhereas property holders in the valley of the Cuyahoga River immediately beyond the limits of the navigable channel have already reached a tentative agreement with each other looking toward cooperation in providing for a straightened extension of the channel; and

Vhereas no concrete plan or proposition for cooperation can be formulated until a detailed survey is made and a plan of improvement suggested: Therefore,

Be it resolved by the board of directors of the Cleveland Chamber of Commerce, That the nited States engineer in charge of harbor works in the Cleveland district be, and e is hereby, respectfully urged to report a recommendation that a detailed survey nd estimate should be made to determine the advisability of the improvement conemplated in the language of the river and harbor act above noted, which survey will urnish the necessary information on which to base a definite proposition for coopertion on the part of the State of Ohio, the city of Cleveland, and the owners of proprty in the river valley; and

Be it resolved, That we respectfully suggest that such detailed survey should deterine, for the purposes of such proposition for cooperation, the following points:

First. The ultimate possible southern limit of slack-water navigation, with regard (*a*) the nature of the bottom; (*b*) the height of the banks above water level; and) the most advantageous connection with the Ohio Canal.

Second. A plan of the extended channel with reference to the adjacent property nd the Ohio Canal.

Third. Recommendations for eliminating bends in that part of the river which is ow navigable.

Fourth. An estimate of the cost of each of the foregoing suggested improvements.

Fifth. An estimate of the acreage of territory tributary to the proposed improveents and its commercial and industrial possibilities; and a report upon the tonnage the port of Cleveland as affected by the proposed improvements.

CLEVELAND ENGINEERING SOCIETY,
Cleveland, Ohio, August 19, 1910.

DEAR SIR: The executive board of the Cleveland Engineering Society, in conmity with the action taken by its committee on rivers and harbors, desires to call ur attention to certain features in connection with your preliminary examination d report as authorized by the river and harbor act of 1910. Said preliminary amination to be in reference to the "Cuyahoga River from its mouth to a more utherly connection with the Ohio Canal, with a view to eliminating bends and curing a navigable depth of 21 feet, with suitable width; with a report on any propoion for cooperation by localities affected thereby."

As engineers we realize the futility of a preliminary examination and report relae to such a matter without a detailed survey which would enable reliable estimates be obtained.

We also still further desire to call your attention to the great difficulty of the city Cleveland, and also the property owners who would be benefited, to make any finite or intelligent proposition relative to cooperation in this improvement with- such a detailed survey and the reliable estimate of cost which would result there- m.

Therefore we wish respectfully to urge upon you the necessity for including in ur preliminary examination a report of recommendation for a detailed survey and imate as follows:

A survey of the Cuyahoga River from its mouth to the ultimate possible limit of ck water navigation, showing the present channel and conditions and the proposed developments, with recommendations for eliminating bends, and the proposed connection with the Ohio Canal; an estimate to be made of the cost of all proposed improvements based upon said detailed survey; an estimate of the area of the propert directly benefited by the proposed improvements; also an estimate and statement a to the general commercial advantages to Cleveland as a port which would resul therefrom.

Very respectfully,

J. W. Frazier, *President*,
F. W. Ballard, *Secretary*,
Cleveland Engineering Society.

Col. John Millis,
Corps of Engineers.

Expenditures for harbor improvement to June 30, 1912, principal harbors of Great Lake

Harbor.	Outer harbor.		Inner harbor.	
	Federal expenditures.	Local expenditures.	Federal expenditures.	Local expenditures.
Duluth-Superior	$110,000	$50,000	$6,759,741	$358,0
Milwaukee	2,349,579	321,356	200	1,515,7
Chicago	2,573,559	Not known.	1,583,781	
Calumet (South Chicago)	1,497,887	95,239	1,186,993	(1)
Toledo	1,631,574		1,087,700	
Lorain	1,049,761			510,0
Cleveland	6,920,066			2,923,5
Ashtabula	1,614,265			
Conneaut	1,035,764			Not know
Erie	1,447,328		(2)	(2)
Buffalo	4,832,000	1,946,354	920,029	3,070,2

[1] Donated land for improvement.

[2] No inner harbor.

NOTES.

Chicago.—Sanitary district expenditures excluded. There has been a small amount expended by t city on inner harbor; amount not known.

Toledo.—Total expenditures prorated between the bay and river in proportion to the lengths of cha nels through each.

Ashtabula and Conneaut.—Dredging and construction of wharves have been done at local expense, b principally for direct improvement of privately owned property. Amount of such expenditures unknow

---

LETTER OF MAYOR OF CLEVELAND.

Cleveland, *August 27, 1913.*

My Dear Major Bromwell: I am handing you herewith a number of copies of report of the special committee of the council appointed to investigate and report the improvement of the lower Cuyahoga River. For the convenience of those w will have to use this report it has been printed, and in transmitting it I beg leave repeat all that appears in my letter of transmittal which I have taken the liberty inserting as a part of the printed document. It has seemed to us that it might be wi if copies of this report could be sent to Washington to be considered by the Board Engineers before they visit Cleveland to view the conditions on the ground, and would also be very much gratified if I could learn when it would be convenient to t board to have me go to Washington and extend in person the city's invitation to it come to Cleveland and make a personal inspection of the situation.

Thanking you heartily for your cooperation with the city in this matter, I am,

Respectfully, yours,

Newton D. Baker,
Mayor.

Maj. Charles S. Bromwell,
United States Engineer.

[First indorsement.]

Office District Engineer Officer,
Cleveland, Ohio, September 12, 1913.

To the Chief of Engineers, United States Army
(Through the Division Engineer).

1. Forwarded.

2. A report of survey and estimate of cost of improving the Cuyahoga River, under the river and harbor act of February 27, 1911, was submitted to the department by Col. Millis on June 29, 1912. This report contained an estimate of cost of the proposed improvements, but at that time the city of Cleveland had not given sufficient consideration to the question to state the character and amount of cooperation which it was prepared to furnish.

3. The River and Harbor Commission of the city of Cleveland made an exhaustive study of the problem, and in their report dated January 19, 1913, they reported favorably on route No. 1, and recommended that the city of Cleveland cooperate to the extent of 50 per cent of the cost. A copy of this report was forwarded to the Chief of Engineers under date of March 17, 1913, with request that no action be taken in this matter until further information had been furnished by the city.

4. The subject was further considered by a special committee of the council of the city of Cleveland, and there is transmitted herewith their report, dated June 30, 1913, with resolutions in council, adopted July 14, 1913, based upon report of this special committee, together with a letter from Hon. Newton Baker, mayor of Cleveland, dated July 24, 1913, pledging on behalf of the city of Cleveland the cooperation of the city in making the improvements, to the extent of paying 50 per cent of the cost thereof.

5. The saving of $180,000, as estimated in paragraph 12 of the report accompanying, is believed to represent fairly well the benefit to be derived by the general public from this improvement. The benefit to the city of Cleveland and to local interests is nore difficult to ascertain. This improvement would open up some 3,400 acres of and and render it suitable for industrial purposes. It is believed that the value of uch land would be increased some $70,000,000 after the improvement had been com- leted and industrial establishments built. This increase in value would be more or ess gradual, and it may be assumed that one-half of it would represent the average ncrease in valuation of this property. On this increased valuation the city of Cleve- and would levy taxes of about 1½ per cent, and its annual tax duplicate would be ncreased about $525,000.

6. There would be also indirect benefits arising from the establishment of numerous mall industries which would use the iron or steel manufactured here. Such plants ould give employment to a great number of artisans and laborers, and the wages pent in housing, feeding, clothing, and entertaining these employees would increase nd stimulate many kinds of business. On the other hand, the city would be put o some additional expense in laying out streets, providing for the lighting and policing f this district, for the establishment of schools, etc., but these direct expenses may e roughly considered as balanced by the indirect benefits previously referred to; o that a fair estimate for the direct benefits by the general public and the city of leveland may be roughly assumed as $180,000 to $525,000, or as about one to three. t therefore appears that, based on the above assumption, the United States should ot pay over 25 per cent of the total cost of the improvement, if the work is done intly.

7. The improvement itself is desirable in the interest of navigation, and should be ade. Whether or not it should be made entirely by local interests or jointly by cal interests and the Federal Government, is a question of policy which Congress pparently intended to decide for itself by ordering directly a survey and estimate of st (without a preliminary examination) and a report on any proposition for coopera- on. The general policy has been to require improvements of this character to be ade entirely by local interests.

8. The extra copies of the reports referred to have been sent direct to the Board of ngineers for Rivers and Harbors, and attention is invited to the request of the mayor be informed when it would be convenient for him to appear before the board and tend in person an invitation to visit Cleveland and make a personal inspection of e Cuyahoga River.

Chas. S. Bromwell,
Major, Corps of Engineers.

[Second indorsement.]

Office Division Engineer, Lakes Division,
Buffalo, N. Y., October 2, 1913.

To the Chief of Engineers:

1. The conclusion arrived at by the city authorities is that the improvement of Cuyahoga River be made as in plan No. 1, paragraph 36, in report of survey, estimated cost $3,100,000, and "that this council assure the Federal officials of this city's willingness to cooperate to the extent of 50 per cent of the cost * * *." The estimated cost of the excavation of the proposed channel is only $186,161, while the remainder of $2,913,839, or 94 per cent, is for the acquirement of lands, building four bridges, and protecting property frontages.

2. The opinion of the division engineer, as expressed in the third paragraph of his indorsement of July 25, 1912, on the report of survey, that this large cost for right of way and building bridges and bulkheads should not be shared in by the United States, is fully concurred in.

3. The statement in paragraph 5 of the first indorsement hereon leads to the opinion that the proposed improvement would be so profitable an investment both to the city of Cleveland and property owners as to justify those interests in undertaking the improvement wholly by themselves.

4. In the case of a similar improvement of Buffalo River at Buffalo, N. Y., all of the cost was assumed by the city of Buffalo, the only part taken by the United States being the approval of plans for new bascule bridges to take the place of former fixed bridges, the railroads assuming the expense of altering their bridges and the city that of its highway bridges.

5. In this connection attention is invited to the fact that no development has yet been made to the 3 miles of frontage protected by the breakwater now under construction by the United States at Cleveland, Ohio.

J. G. Warren,
Colonel, Corps of Engineers.

Report of the Special Committee of the Council Appointed to Investigat and Report on the Improvement of the Lower Cuyahoga River.

Cleveland, *July 24, 1913.*

Dear Sir: I am submitting to you herewith a printed copy of a report of the specia committee of the council of the city of Cleveland on the subject of the improvement o the lower Cuyahoga River in the city of Cleveland, filed with the council on June 30 1913.

I beg to call your attention to resolution file No. 30151, adopted by the council o the city of Cleveland on July 14, 1913, by a unanimous vote, which you will fin printed with the aforesaid report. The terms of this resolution authorize and direc me to submit to the Federal authorities an offer of cooperation on the part of the city o Cleveland with the United States Government in the improvement of the lowe Cuyahoga River as described in the report.

It is a great pleasure for me to comply with this direction, for the improvemen is of vital importance, not only in the prevention of floods in the locality of the improvement but also to a proper accessibility to the Great Lakes of a large and constantly increasing volume of commerce through the Cuyahoga River to the rapidl growing manufacturing section in the upper Cuyahoga Valley. On behalf of th city of Cleveland I therefore offer to the United States Government, through you the cooperation of the city of Cleveland in the making of this improvement to th extent of paying 50 per cent of the cost thereof.

Yours, very truly,

Newton D. Baker, *Mayor.*

Maj. Chas. S. Bromwell,
United States Engineer,
Cleveland, Ohio.

[Council Resolution—File No. 30151.]

Whereas a survey of the Cuyahoga River and an estimate of the cost of its improv ment from Lake Erie to a more southerly connection with the Ohio Canal wa authorized by Congress February 27, 1911, which authorization also included th consideration and report on any proposal to cooperate in the making of this improv ment by the locality affected, and

Whereas the United States engineer officer in charge of the Cleveland district has made this survey and submitted a report, which is now in the hands of the Board of Engineers for Rivers and Harbors at Washington, and

Whereas the Cleveland River and Harbor Commission, after several months' investigation and study, submitted to this council on January 18, 1913, a report recommending the improvement of the Cuyahoga River in accordance with route No. 1, which report also states that in the interests of navigation the improvement is necessary and the estimated expenditure is fully justified, and

Whereas this council, with a view of determining the proper division of the expense involved, appointed a special committee on March 3, 1913, to investigate and gather such information as may be available to show what benefits would be derived from the improvement of the lower Cuyahoga River, first, by the city of Cleveland, and, second, by the Federal Government, and

Whereas on June 30 the special committee submitted a report recommending that this council assure the Federal Government of the city's willingness to cooperate to the extent of 50 per cent of the cost of the improvement of the lower Cuyahoga River below the Cincinnati slip in accordance with route No. 1, as recommended by the River and Harbor Commission, and

Whereas both the River and Harbor Commission and the special committee express the opinion that the cost of improving the lower Cuyahoga River is fully justified; Now, therefore, be it

Resolved, That it is the sense of this council that this improvement should be com- leted as speedily as possible and that the city of Cleveland hereby expresses its illingness to cooperate with the Federal Government in the making of this improve- ent to the extent of 50 per cent of the cost (such part of the 50 per cent to be assessed pon the benefited property as may later be determined); the plan of improvement, etails of cooperation, method of prosecuting the work, and all other details to be bject to the approval of the Secretary of War, and be it further

Resolved, That for every appropriation set aside by the United States to be used in is improvement this council pledges itself on behalf of the city of Cleveland to ap- ropriate as soon as practicable an equal amount, and be it further

Resolved, That the mayor is hereby authorized and directed on behalf of the city Cleveland to make this offer of cooperation to the proper Federal authorities.

(Adopted by a unanimous vote July 14, 1913.)

EPORT OF THE SPECIAL COMMITTEE OF THE COUNCIL APPOINTED TO INVESTIGATE AND REPORT ON THE IMPROVEMENT OF THE LOWER CUYAHOGA RIVER.

o the honorable council of the city of Cleveland.

GENTLEMEN: 1. On March 3, 1913, by resolution No. 28438, we were appointed a special committee "to investigate and gather such information as may be available t show what benefits will be derived in the improvement of the lower Cuyahoga River by the shippers of freight, the city of Cleveland, and the Federal Government, with a view of supplying this body with the necessary data to enable it to determine upon a proper division of the expense involved."

2. After a number of meetings and conferences with those interested in and informed o water transportation and harbor improvements, your committee begs to report as follows:

3. The widening, deepening, straightening, and otherwise improving the Cuyahoga River between the present upper limits of navigation and the Denison-Harvard Viaduct (G to H on the attached map) was authorized by the Federal Government January 24, 1913, in accordance with dock lines previously established by this council. This improvement is being made by the interested property owners and the city, and will add 1.6 miles of channel, or 3¼ miles to the present 12 miles of river dock frontage. Two winding basins are to be constructed in connection with this improvement, which, with the present winding basin at the Ohio Canal Lock, will afford three winding basins sufficient in size to wind vessels 700 feet in length. The channel from the present upper limits of navigation downstream to the Erie Railway bridge, together with the upper river channel now being improved (G to F) will have a total length of 3.3 miles and will be sufficiently wide and straight to provide for the navigation of vessels even greater in length than 700 feet. This portion of the Cuyahoga River is developing into the most important part of Cleveland's harbor. As shown by the River and Harbor Commission's report, a very large proportion of the river tonnage is handled in the upstream one-third of the channel. The low-lying valley land in this location has a greater width and is less expensive than the valley land near the lake, and is therefore better adapted for industrial and transfer purposes.

4. The three-fourths of a mile channel from the Government pier heads in the la to the Superior Viaduct (A to B) has an average width of 280 feet, the minimum co traction being 130 feet at the Lake Shore & Michigan Southern Railway bridg From the standpoint of navigation this portion of the river channel is very satisfacto except that the congestion at the Lake Shore & Michigan Southern Railway brid should be relieved and will be by the improvement which has been contemplated f a number of years and for which a Federal appropriation is provided.

5. As shown in attached tabular statement No. 1, the Cuyahoga River chann from the Erie Railway bridge to the Superior Avenue Viaduct (F to B) has 12 curv or bends, with radii (to the center of the channel), and total deflections in a distan of 2.92 miles of considerably more than two complete circles, and the radii of eight the bends are less than 600 feet. The channel is contracted and obstructed in varyi degrees by 13 bridges, 5 of which have center piers, and in 4 instances bridges a located at or near bends. The average width of this portion of the channel is abo 145 feet, and the minimum width at bridges 110 feet. Vessels greater in length th 480 feet can not reach the upper river terminals because of not being able to pa through this portion of the channel, and the many abrupt bends and contractio render its navigation by smaller vessels difficult and tedious. It is to the improv ment of this lower portion of the Cuyahoga River in accordance with Route No. 1, recommended by the Cleveland River and Harbor Commission, that your committ has directed its attention.

6. This improvement would permit about 78 per cent of the present or old riv channel between the Erie Railway bridge and the Superior Viaduct to exist in t form of slips. The rapidly increasing commerce carried through this channel to t upper river has very materially reduced the use of the docks for commercial purpos a large proportion of the dock frontage on this portion of the channel is now unoc pied or devoted to noncommercial uses. Based on the traffic of 1912 the amount freight transferred over the 19,219 feet of docks located between the Cleveland, C cinnati, Chicago & St. Louis Railway lower bridge and the Wheeling & Lake Erie low bridge (C to E) was 279,627 tons, or 14.5 tons per linear foot of dock; while the amou of freight transferred over the 23,232 feet of dock between the lower Wheeling & La Erie Railway bridge and the upstream limits of navigation (E to G) was 3,227, tons, or 138.9 tons per linear foot of dock frontage. The improvement herein conte plated will benefit the 5.2 miles of water frontage between the Erie Railway bri and the Superior Viaduct in two ways: First, the present congested condition of channel will be relieved, thereby permitting vessels to load and unload without be disturbed by passing vessels as at present when the channel is operated as a m thoroughfare; Second, this improvement will permit the using of the slips by largest freight vessels now navigating the Great Lakes. This change of conditio we feel, will bring about a change of occupancy of the adjoining water frontage fr industrial and nonuse to uses more directly allied to water transportation. Th slips would be even more desirable than the outer harbor for the mooring of vess during the winter season, for the reason that they are afforded fire protection and much more accessible tied to the dock than when located several hundred feet fr land in the outer harbor.

7. The transfer of bulk freight to or from water in Cleveland takes place in locations: First, the outer harbor and old river bed; second, in the Cuyahoga Ri upstream from the Superior Viaduct. The inbound freight handled on the Cuyah River may be divided into two classes: First, the material remaining at or near docks which is not transshipped; second, that which is transshipped. Both cla of this freight, in order to be transshipped economically, requires unloading machin the first cost of which is expensive, and the greatest economy in unloading res only from the operation of modern machinery and during the entire season of na gation. As a specific instance, one company in the upper river valley transsh annually to western Pennsylvania and southern points from 200,000 to 300,000 to If this company had to construct and operate another plant on the lake front, or if material had to be unloaded at any plant other than the one owned and operated by company, it is evident that the unloading charges would be excessive, which ex would ultimately be paid by the consumers, who are located over a wide area. Co tions should therefore be provided which will render the most economical transfe bulk freight from water to rail, viz, conditions which will provide for combi industrial and commercial terminals or unloading plants along the river docks. T this operation of locating industrial plants on the lake front and transferring s freight as may be used locally and also transshipping from the same plant can no accomplished is due to the fact that the space on the outer harbor between the exist railroad tracks (the Lake Shore & Michigan Southern) and the dock or harbor lin barely sufficient to accommodate modern bulk freight unloading and storage pl

t which nothing of an industrial nature is attempted, and furthermore, we believe hat the outer harbor is so well adapted to the needs of commerce that it should be eserved for purely commercial uses.

8. The president of a local manufacturing company using large quantities of iron nd steel is authority for the following statement: "* * * Every Cleveland manuacturer who buys anything in the line of steel products knows that up to this minute ve are buying everything based upon Pittsburgh freight rates. If we buy nails, wire, r any product of iron or steel, we pay the Pittsburgh price plus the freight to Cleveand. The price is f. o. b. Pittsburgh whether it comes from Youngstown, Buffalo, anton, or Cleveland, and the price is two or three dollars a ton above what the Pittsurgh manufacturers have to pay for the same material. I think there is no one hing that can be done that would be so advantageous to Cleveland as to have the ver improved so that it could be used for manufacturing sites." While this stateent of Mr. Charles E. Adams was made in behalf of Cleveland manufacturers, it also dicates that the Cleveland consumers of these products would benefit in a like degree y this improvement, and the fact which is of the most importance is that the benefits erived from the establishment of an independent iron and steel market in Cleveland ill extend far beyond the limits of this city, and we believe that the construction of a hannel through the lower flats which will enable all Great Lakes bulk carrying vesels to reach the extensive and economically located area in the upper valley will be attractive that the completion of this improvement will be followed very closely by on and steel industries the operation of which will remove the differential which is w charged by the Pittsburgh and other markets due to the limited supply in the leveland district. The attached tabular statement No. 2 shows the transportation sts of assembling the three ingredients of pig iron at various locations. This table dicates that pig iron can be produced in the Cuyahoga Valley at a saving of about .08 per ton over adjacent pig iron producing districts. The amount consumed over e district supplied by this market approximates 550,000 tons per annum, or a net ving of $594,000. A pig iron production in the Cuyahoga Valley sufficient to estabh a base price over the Cleveland district would not only still further reduce the st of steel products in the Cleveland district, but the competitive effect would ve a tendency of reducing prices in adjoining pig iron producing districts.

9. This improvement would benefit the city of Cleveland by increasing the value taxable property, thereby permitting a reduction in the tax rate, or making possible e providing of additional funds for public improvements. If commercial and dustrial developments follow the completion of this improvement as such developent has followed river improvements in the past, the additional receipts from taxes d increased ability to issue improvement bonds will be of material benefit to this y; and while the city's expenditures would be increased due to the additional mand for public improvements and added maintenance charges, we are confident re would result a very considerable net gain to this community.

0. The annual amount paid by manufacturers for wages and salaries in Cleveland a number of years, as determined by the chamber of commerce, has been about per cent of the first cost of the plants; based on the estimated cost of improvements, $110,000,000, the additional amount paid for labor and various trade and expert vices would amount annually to about $33,000,000, or the industrial and commercial velopment as outlined would furnish 300 days work per year for not less than 37,000 rkmen. These workmen would represent a demand for a similar number of homes ich in turn would require additional labor and would represent an increased dend for building materials, household and miscellaneous supplies, merchandise, fessional and other services. For these reasons your committee is of the opinion t benefits so far reaching to the citizens of Cleveland justify the city's liberal stance in financing this improvement.

1. The completion of this improvement will permit the city to abandon lower l middle West Third Street bridges and connect West Third Street through on a ight line from Canal Road to Factory Avenue. This is the street on which a street line would be located to provide for the upper river district, and the abandon- of these two movable bridges and removal of the bends in the street as it now sts would facilitate rapid street car service to a very desirable extent.

2. The Federal Government through its Department of Commerce and Labor in ansportation by Water in the United States, Part 1," states: "On the coasts and Great Lakes there has been a marked increase in the size of vessels, bringing about duction in transportation costs." It may also be added in this connection that the d increase in the size of Great Lakes freight vessels has also brought a reduction in inal or transfer charges (see tabular statement No. 10), and an engineer who designs builds bulk freight machinery is authority for the recent statement that transfer rges can be still further reduced by increasing the size of unloading machinery·

but the larger unloading appliances can no longer be used on the smaller vessels. Thi condition will have the tendency of still further increasing the size of freight vessel and of continuing the construction of the present larger sizes; and the converse of thi is also true, viz: That the limiting channel of the lower river and the consequen enforced use of small vessels has a tendency to increase transportation and termina charges on several million tons of commerce which is carried through the lower Cuyahoga River. It is also stated in the volume last referred to that "the terminal is th weak link in the water system widely nullifying the advantages of cheap water transportation." While there are large terminals or unloading plants located along th upper river and while there is ample transfer and storage space for the bulk freight and extensive area (3,400 acres) for future development, the efficiency of these termina facilities, both present and prospective, is being impaired for the reason that Great Lake vessels small enough to reach these docks are rapidly decreasing. Only about 55 pe cent of the American freight-carrying vessels on the Great Lakes can pass through th abrupt bends and narrow channel of the lower river, and this number is decreasin each year. The attached tabular statement No. 3 shows the length and carryin capacity of all lake freighters constructed since 1900. For convenience in considerin this improvement, lake freight vessels are arbitrarily divided into two classes, viz First-class vessels or those 480 feet in length or over and which do not navigate th Cuyahoga River; second-class, or those vessels less than 480 feet in length and which can navigate the Cuyahoga River.

It is interesting to note on tabular statement No. 4 that the first vessel constructed which belongs to the first class, was launched in 1900, and since 1905 new vessels c this class have been greatly in excess of the second-class freighters, and all the bulk freight vessels launched during the last two years have belonged to the first class Considering the fact that the first first-class vessel was constructed 13 years ago an that now practically one-half of the bulk-freight vessels on the Great Lakes are excluded from the upper-river docks, leads us to the conclusion that if the Cuyahog River channel exists as it is to-day for another 13-year period, the number of vessel that can reach the upper-river terminals will be so few that a very substantial diffe ential will be charged. One upper-river shipper whose inbound tonnage amounte to 990,000 tons in 1912, replying to questions regarding the improvement of the lowe river and the future tonnage of the upper river, writes: "We figure that our inboun tonnage by water five years hence will amount to 2,000,000 tons of iron ore and 300,00 tons of limestone per season; our outbound tonnage by water will amount to 100,00 tons bituminous coal and 100,000 tons of steel products. If the river is not straightene it will be impossible to secure sufficient vessel capacity to take care of this inboun business in a season where there is a big demand for vessel tonnage without paying high premium. Also, you probably know nine-tenths of the vessels which now tak ore to the river ore docks are not of the type of construction adapted for economic unloading with the large ore-unloading equipment now being installed. Regardin the manufacture of coke at blast furnaces, instead of in the coal-mining districts: W believe this will increase the water transportation of this port in the way of shippin out cargoes of coke to various upper-lake destinations, Cleveland being especiall well equipped for this coke production on account of the freight rates from Pennsy vania and West Virginia fields."

The river and harbor commission have estimated that the iron-ore commerce alon upstream from this contemplated improvement will within the next five years prob ably amount to 7,000,000 tons annually. Figures obtained from three independen sources have revealed the fact that the difference in the cost of carrying a ton of iro ore in a vessel 600 feet in length (capacity 12,000 tons) and the cost of carrying a ton ore in a vessel 400 feet in length (capacity 6,000 tons) is not less than 6 cents per to To this carrying charge should be added about 2 cents to cover the additional cost unloading the smaller vessel. It is hardly probable that the vessel owners will co tinue indefinitely to bear this extra cost of delivering cargoes in the upper Cuyahog Valley without making an extra charge. Indeed the tendency of the interstate con merce regulations make it not unlikely that the Government may eventually requi the lake freight rates to be proportioned in accordance with the cost of the service. F these reasons we feel safe in assuming that the enforced use of the small and therefo uneconomical vessel, will involve a minimum extra transportation and transfer charg against the upper-river tonnage approximating 5 cents per ton, while the maximu differential would probably not exceed 10 cents per ton for a number of years. Assu ing the average (7½ cents) of these two extremes to be in operation for 5 of the next years and not to be in operation the other 10 years the extra cost to the upper-riv shippers during the entire 15-year period would amount to $2,600,000, which ext charge would be borne by the consumers of this freight. This improvement woul therefore have a tendency of either effecting a decrease in freight rates or preventi

n increase of approximately 6 per cent per year. The total saving for the 15-year
eriod would amount to $180,000 per year, which, on the basis of 4 per cent interest,
vould justify an investment of about $4,500,000, or an expenditure of $6,000,000 would
e justified if a 3 per cent interest-bearing loan could be negotiated. Your committee
s therefore of the opinion that both the upper-river shippers and the Federal Govern-
nent could well afford to contribute toward the cost of an improvement that will
ender the upper-river terminals easily accessible to all vessels navigating the Great
akes and thereby save transportation and transfer charges which in a few years will
robably extend into millions of dollars.

13. The port of Cleveland as a transfer and distributing point is important and is
apidly increasing in importance, for the following reasons: First, Cleveland is lo-
ated on one of the main arteries of traffic between the East, with New York City
s a center, and the West. Second, the Cuyahoga River valley is an economically
avorable location for the assembling of iron ore from the Northwest, coal and coke
om western Pennsylvania, West Virginia, and the East Ohio coal fields, and lime-
one from the westerly end of Lake Erie. Third, recently the State of Ohio has im-
roved that portion of the Ohio Canal between the canal weigh lock at the lower
inding basin in the Cuyahoga River and the Muskingum River at Dresden. This
nprovement has consisted in widening and deepening the canal and constructing
ncrete locks, the total cost to date approximating $1,000,000. This canal and its
ranches pass through the eastern and southern Ohio coal fields, a large agricultural
istrict, and industrial sections of considerable importance, the most notable of which
e Akron, Canton, and Massillon. The Ohio Canal forms the connecting link be-
een the Great Lakes and the Ohio River. It is difficult at this time to predict
e amount of commerce that will be carried on this waterway, but the possibilities
e such as to deserve serious consideration of the effect of its commerce upon this
rt. Fourth, the completion of the New York State Barge Canal will make possible
e bringing to Cleveland by water for consumption and distribution such materials
slate, marble, paving stone, and cement, all of which originate on the barge canal
its branches. One of the benefits to be derived from the completion of the Panama
nal will be the shipping of lumber from the Pacific coast to Cleveland by the all-
ater route at a saving of from $7 to $9 per thousand over the present practice of
ipping by rail overland. Fifth, the widening, deepening, and otherwise improving
e Welland Canal, so as to accommodate the largest vessels now navigating the
eat Lakes, and thereby connecting Cleveland and the Cuyahoga River with salt
ater navigation, will undoubtedly create an increased demand for the transfer and
stributing facilities of this port.

14. The maximum discharge through the Cuyahoga River during the flood of 1904
as 27,600 cubic feet per second, and the greatest discharge during the flood of last
arch, as determined by current meter observations, was 32,400 cubic feet per second,
a run-off of 44 cubic feet per second per square mile. An analysis of the rain record
that period indicates that the high water was caused by a rainfall of 3 inches,
hich fell during the 20-hour period beginning at 2 p. m. of the 24th. This 3 inches
rain was preceded by two preliminary storms, amounting to 2.31 inches. These
eliminary rains saturated the ground, thereby causing the 3 inches which fell
ring the 20-hour period to produce a high run-off. According to the rain-gauge
adings which have been taken in Cleveland since 1879, a rainfall of 3 inches in a
riod of 20 hours is likely to occur once every 11 years. The only other condition
cessary to cause high water is the thorough saturation or freezing of the ground.
ese figures are verified by the fact that extreme high water has occurred in the
yahoga Valley in the following years: 1881, 1893, 1904, and 1913. It is therefore
ident that another flood may be expected not later than 1924 and other floods at
ervals of about 11 years. Since the Cuyahoga River valley has been flooded to
damaging extent about every 9 or 10 years, the recent flood may therefore be con-
ered merely another decennial object lesson. While the water last March was but
le higher than during the previous flood periods, the damage was considerably
ater than heretofore, for the reason that property values and developments in the
yahoga Valley have greatly increased since the last high water. The total sub-
rged area, including both developed and undeveloped property below the Denison-
rvard Viaduct, was 2,740 acres, and is shaded in red on the attached map. The
ount of damage thus far reported from companies and individuals amounts to about
$250,000. However, it will be impossible to reduce to dollars and cents the loss
sed by the enforced and somewhat prolonged suspension of commerce due to the
merged railway tracks and various items of damage to railway property, suspen-
n of various other operations, and miscellaneous items of damage. About 16 years
, at a cost of $550,000, the city widened that portion of the channel which is between
old river bed and the Superior Viaduct, and this portion of the channel proved

entirely adequate to provide for the maximum discharge during the last flood, the water rising no higher than the dock level. The highest elevation of water at the Main Avenue Bridge being about 2½ feet below the top of the docks.

Recently the city widened, straightened, deepened, and otherwise improved, at an approximate cost of $490,000, that portion of the channel which is located between the Erie Railway bridge and the present upstream limits of navigation. This improvement eliminated the narrow and crooked channel at Jefferson Avenue which was entirely inadequate both from the standpoint of navigation and flood discharge, and provided a channel width of 200 feet and a depth from the dock level of about 31 feet The deflections in the channel are such as to offer but slight resistance to flow. This improvement had but little helpful effect during the last flood for the reason that the flow was obstructed by the contracted and crooked channel between the Superior Viaduct and the Erie Railway bridge, which channel is described in paragraph 5 of this report. The straightening of the river channel from the Erie Railway bridge to the Superior Viaduct, as recently recommended by the river and harbor commission. will provide a channel with capacity sufficient to carry the recent high water with a factor of safety of almost two, which factor will apply to the new channel when straightened and deepened as far south as the Denison-Harvard Viaduct. While the straightening of this portion of the river has been undertaken principally in the interests of navigation and commerce, the recent high water has again demonstrated that the work is almost as important as a safeguard against future flood damage. (Appended to this report are four photographs, two of which were taken during the high water of last March and two taken recently but at the same locations used in taking the two flood photographs.)

15. The present plan of improving the lower Cuyahoga River in accordance with route No. 1 involves widening the channel at the Superior viaduct on the west side opening the west channel, and the probable removal of the center pier of the Superior viaduct. A new cut is to be made from near the proposed location of the new high level bridge, through the flats about 1,200 feet to the present channel. This cut wil eliminate the congestion at the Irishtown Bend and the present difficulty of navigating the narrow bend at Columbus Road. The length of the old channel from the upper and lower limits of the new cut is 5,200 feet. From the upper end of this cut another new channel will be completed, meeting the old channel approximately opposite the Cincinnati Slip (D). This cut eliminates the very troublesome Collision Bend. The length of the new channel is 2,000 feet and the length of the present channel is 4,500 feet. The number of bridges encountered by vessels passing along the present channel from the Superior viaduct to the Cincinnati Slip (B to D) is 7, while the new channel between these limits will be crossed by 5 bridges. The completion of the above described portion of the contemplated improvement will remove all bends from the lower river, excepting the bend which would be eliminated by the Mahoning cut While this bend is a very undesirable one from the vesselman's standpoint, yet its dimensions are such that it can be navigated, although slowly, by many of the large size vessels. By first completing the two cuts below the Cincinnati Slip the cost of dredging the Mahoning cut should be lessened by the length of haul being reduced 6,500 feet and by the relieved congestion in the lower channel. If all attention i given to this portion of the improvement alone, it can probably be completed at a earlier date than by prosecuting the work of all three of the cuts at one time. W therefore beg to urge upon your honorable body the urgent necessity of completing this portion of the improvement first, and with all possible haste. The estimated cos of the lower Cuyahoga River improvement below the Cincinnati Slip is $3,100,000 On the basis of the river and harbor commission's recommendations, that the city and benefited property pay one-half of this cost and that the Federal Governmen assume one-half of the expense, the cost to the Government would be $1,550,000, o 30 cents per ton of the annual tonnage based on the river commerce above the Superio viaduct in 1912; or based on the tonnage upstream from the Cincinnati Slip, which tonnage will probably be more directly benefited than that downstream, the Government's share of the expense would be 47 cents per ton. The commerce between th Cincinnati Slip and the Erie Railway bridge in 1912 added to the annual tonnage estimated by the river and harbor commission, which will be carried upstream from the Erie Railway bridge within the next five years would involve a Federal expens of 21 cents per annual ton of commerce.

16. As shown on the attached statement No. 5, the Federal Government has expended more than $1,000,000 per harbor for the improvement of 25 harbors on sal water, exclusive of New York and Boston. The amount paid by the Federal Government in the improvement of these harbors exceeds 47 cents per ton in 23 of thes cases, and the average expenditure on the 25 ocean ports costing over $1,000,000 i $1.18 per annual ton.

17. As indicated on the attached tabular statement No. 6, $1,000,000 or more has een expended by the Federal Government in the improvement of each of 51 river rojects, 47 of which cost over 47 cents per annual ton and 48 over 21 cents per annual n, and the average Federal expenditure for the 51 river improvements is a minimum 73 cents per annual ton.

18. The attached tabular statement No. 7 shows that the Federal Government has pended 47 cents per annual ton, or over, on 30 harbors on the Great Lakes and in cess of 21 cents per ton in 37 cases; while in 12 Great Lake projects the Federal sistance has been less than 47 cents per annual ton and in 5 instances less than 21 nts per annual ton; the average expenditure for the 41 improvements being 47 cents r annual ton.

19. As indicated by the report for the year 1911 of the Chief of Engineers, United ates Army, the Federal Government has expended, including unexpended approiations, a grand total of $467,306,901 on all salt-water, river, and Great Lake projects, hich had a total tonnage in 1911 of 678,497,531 tons, or the average Federal assistce on these improvements amounts to 69 cents per annual ton.

20. As shown on the attached tabular statements Nos. 8 and 9, the city has expended date on Cuyahoga River improvements $3,545,028.97. If to the actual cash outlay the city for Cuyahoga River improvements be added the cost of engineering, and terest on such portion of the last-mentioned amount as was borrowed and on which terest is being paid at the rate of approximately 4 per cent, the total amount exnded by Cleveland since 1856 for river improvements will approximate $4,500,000. considerable portion of this amount has been devoted to the construction of pernent improvements which have benefited navigation both by increasing terminal ilities and improving the Cuyahoga River as a general channel of approach. If the y bears half and the Government assumes half of the expense of the present project low the Cincinnati Slip, the amount paid by the city of Cleveland for Cuyahoga ver improvements, not including engineering and interest, will be 76 per cent of e total cost.

1. Including unexpended appropriations the Federal Government has expended the port of Cleveland since 1825, $7,624,666.77, which on the basis of the tonnage ow the Superior Viaduct and in the outer harbor for 1912 amounts to 80 cents per nual ton. Adding to this commerce the tonnage handled below the Cincinnati Sp, the cost per annual ton is 68 cents. The Cleveland River and Harbor Commission l soon report upon a plan for a very extensive increased use of the outer harbor. In s connection it may be interesting to note that negotiations have very recently n completed with two navigation companies for space on the outer harbor near foot of East Ninth Street which will involve the handling of approximately 600,000 s of packet freight per annum and 900,000 passengers. One of these docks will be lized by the largest passenger steamer on fresh water and the largest side-wheel vessel at.

2. Your committee is confident that the largest item of benefit to be derived from s improvement will be the effect upon transportation and terminal charges on a idly increasing volume of upper Cuyahoga River commerce, which in 1912 ounted to 5,206,715 tons; these benefits will be distributed over a wide area, the its of which are rather difficult of exact location.

he item of benefit which we are inclined to rate as second in importance is the bable reduction in the cost of iron and steel products. This again will extend over ide area, the limits of which may in a few years include and extend beyond other and steel manufacturing centers.

he large and rapidly increasing property values in the Cuyahoga Valley will be tly benefited by the prevention of future flood damage.

he city will be favorably affected by the increase in terminal capacity and thereo the value of the lower river transfer docks and the upper river commercial and ustrial areas.

he city will also be benefited by its increased ability to finance public improvets, the immense increased demand for labor and material, and the improvement est Third Street.

. Your committee regrets that it is unable to determine with mathematical preon the exact proportion of benefits derived respectively by the local and Federal ernments, but we feel confident that the cost of the improvement is fully justified that either Government would be warranted, on the basis of benefits derived, efraying the entire expense of the project. For the reason that both the local general benefits are so large, and since, and as hereinbefore shown, the Federal Govnent would be expending an amount considerably less than is the general practice, ecommend that this council assure the Federal officials of this city's willingness

to cooperate to the extent of 50 per cent of the cost of improving the lower Cuyaho
River below the Cincinnati Slip in accordance with route No. 1, as recommended b
the river and harbor commission.

Respectfully submitted.

Jos. Menning,
Jas. J. McGinty,
Wm. J. Horrigan,
Wm. Stolte,
Wm. B. Woods,
Special Committe

Cleveland, Ohio, *June 30, 1913.*

Statement No. 1.—*Showing radii, and distance from Superior Avenue Viaduct, a deflections of curves or bends in the Cuyahoga River Channel between the Erie Railro bridge and the Superior Avenue Viaduct.*

Location of bend.	Distance from Superior Viaduct.	Radii.	Deflection.	
			Degrees.	Minute
	Miles.	*Feet.*		
Superior Viaduct	0	295	81	....
Irishtown	0.47	772	81	
Columbus Road	.79	405	92	
Girard Street	.95	530	45	
Baltimore & Ohio freight station	1.13	540	76	
Big Four passenger bridge	1.25	665	27	....
Collision Bend	1.64	350	147	....
West Sixth Street	1.84	1,110	39	
Cincinnati Slip	2.03	1,250	21	
Walworth Run	2.22	520	46	....
Mahoning Avenue	2.45	305	51	
Dry Dock Street	2.92	372	108	....
Total	....	....	817	

Statement No. 2.—*Showing transportation assembling charges on raw material (2 to of iron ore, 1 ton of coke, one-half ton of limestone) to produce 1 ton of pig iron.*

Pittsburgh district	$5.
Wheeling district	4.
Youngstown or Valley district	4.
Chicago district	4.
Cleveland district	3.

Statement No. 3.—*Showing length and capacity of all Great Lakes American frei vessels constructed since and including 1900.*

Name.	First class.[1]		Second class.[2]	
	Length.	Capacity.	Length.	Capac
1900.				
Edenborn, Wm	498	8,300	....	......
Elwood, Isaac L	498	8,300	....	......
Gates, John W	498	8,300	....	......
Hill, James J	498	8,300	....	......
Poe, Gen. Orlander M	490	7,800	....	......
Albright, John J	....	....	436	7,
Bryn Mawr	....	....	420	7,
Bunsen, R. W. E	....	....	466	7,
Cornell	....	....	474	7,
Dimmick	....	....	424	7,
Harvard	....	....	474	7,
Mitchell, Alfred	....	....	290	3,
Murphy, Simon J	....	....	448	7,

[1] First class: Vessels 480 feet in length and over.
[2] Second class: Vessels less than 480 feet in length.

TATEMENT No. 3.—*Showing length and capacity of all Great Lakes American freight vessels constructed since and including 1900*—Continued.

Name.	First class.		Second class.	
	Length.	Capacity.	Length.	Capacity.
1900.				
arsala			456	8,000
eptune			366	5,500
rinceton			474	7,500
eis, Wm. E			436	7,000
ensselar			474	7,700
ranton, Walter			436	7,000
aw, Howard L			448	7,400
an Hise, Chas. R			263	2,200
accamaw			466	7,600
ilson, Capt. Thomas			436	7,000
Total		41,000		121,600
1901.				
ristopher			430	6,300
lonel			376	5,800
phicke, Mary C			450	7,000
agg, G. A			338	4,300
christ			376	6,000
ffelfinger, F. T			450	7,000
tchinson, J. T			366	5,500
oiter			366	5,500
ke Shore			376	5,900
ck, Wm. S			366	5,500
itland, Alex			386	5,600
on			289	3,200
vey, Frank H			450	7,000
vey, Geo. W			450	7,000
inbrenner, Henry			440	6,600
mpson, A. W			320	4,400
aus			366	5,500
rner, Randolph S			338	4,300
lls, Frederick B			450	7,000
itney, David M			432	7,000
rriner, S. D			320	4,400
emite			376	5,600
Total				126,400
1902.				
ftain			362	4,900
h, Wm. F			366	5,000
mmer, G. J			454	6,900
wick, Wm. H			436	7,000
t, Frank W			400	6,500
t, James H			424	6,700
s, J. M			434	7,000
on			366	5,400
ingham, Wm			400	6,300
Harold B			400	6,300
rn, F. M			400	6,500
ay			376	5,700
ders, E. N			400	6,500
h, L. C			434	7,000
ra			366	5,000
King			400	6,500
art, A. E			376	5,000
na			366	5,000
or, Moses			436	7,000
ner, Chas. M			390	5,600
son, C. W			400	6,500
inson, H. S			390	5,600
Total				134,600
1903.				
, Geo. L			380	5,900
h, G. Watson			376	6,000
rist, F. W			436	7,000
rist, J. C			436	7,000
ood, H. B			434	7,000
d, R. L			436	7,000
ngton			380	5,500

STATEMENT NO. 3.—*Showing length and capacity of all Great Lakes American freig vessels constructed since and including 1900*—Continued.

Name.	First class.		Second class.	
	Length.	Capacity.	Length.	Capaci
1903.				
Kerr, D. G			468	7,
Leonard, Geo. B			400	6,
Mack, Wm. Henry			374	5,
Miller, P. P			374	5,
Minch, Anna C			400	6,
Montezuma			362	4,
Reed, James H			468	7,
Saxona			436	7,
Schuck, R. E			436	7,
Sill, Henry S			436	7,
Sinaloa			436	7,
Smith, Lyman B			400	6,
Smith, Hurlburt W			436	7,
Smith, Monroe C			400	6,
Smith, Wilbert L			400	6,
Sonoma			436	7,
Squire, F. B			430	6,
Walker, Perry G			436	7,
Wallace, Robt			261	2,
Weeks, J. L			436	7,
Western Star			436	7,
Woodruff, Lewis			436	7,
Total				187,
1904.				
Sahara	494	8,000		
Augustus B. Wolvin	560	10,000		
Edwin F. Holmes			434	6,
Wisconsin			434	6,
Umbria			440	6,
Francis Widlar			436	6,
Martin Mullen			436	6,
R. W. England			376	5,
Total		18,000		36,
1905.				
Ball Bros	500	8,000		
James C. Wallace	552	10,000		
Philip Minch	500	8,000		
Sylvania	524	9,000		
Amasa Stone	545	10,000		
L. C. Hanna	524	9,000		
E. H. Gary	569	10,500		
S. M. Clement	500	8,000		
Socapa	524	9,000		
Lyman C. Smith	545	10,000		
Wm. E. Cory	569	10,500		
W. A. Paine	500	8,000		
W. A. Rogers	545	10,000		
Powell Stackhouse	524	9,000		
H. C. Frick	569	10,500		
John Stanton	524	9,000		
Joseph G. Butler, jr	545	10,000		
James E. Davidson	524	9,000		
Hoover & Mason	524	9,000		
Peter White	524	9,000		
W. G. Mather	531	9,300		
James P. Walsh	500	8,000		
Eugene Zimmerman	500	8,000		
Geo. H. Russel	484	7,600		
Frank J. Hecker	484	7,600		
Francis L. Robbins			400	5
Total		226,000		5

tatement No. 3.—*Showing length and capacity of all Great Lakes American freight vessels constructed since and including 1900*—Continued.

Name.	First class.		Second class.	
	Length.	Capacity.	Length.	Capacity.
1906.				
. K. Bixby	500	8,000		
nes B. Wood	534	9,500		
ank C. Ball	550	10,000		
F. Jones	550	10,000		
. Selwood	545	10,000		
D. Carter	524	9,000		
as. S. Hebard	524	9,000		
ftus Cudy	545	10,000		
raham Stearn	545	10,000		
vid Z. Norton	500	8,000		
n Sherwin	534	9,500		
rry Coulby	569	10,500		
rvey D. Goulder	545	10,000		
P. Morgan	600	12,000		
nry B. Smith	545	10,000		
Thomas Shaughnessy	500	8,000		
J. Earling	545	10,000		
s. Weston	569	10,500		
nry H. Rogers	600	12,000		
. Riddle	552	10,000		
Y. Townsend	602	12,000		
man B. Ream	600	12,000		
R. Hanna	552	10,000		
er A. B. Widener	600	12,000		
. Morrell	602	12,000		
uel Mather	550	10,000		
. P. Snyder	550	10,000		
es Laughlin	550	10,000		
higan	550	10,000		
eming	550	10,000		
. Sheadle	550	10,000		
. Bartow	524	9,000		
dennis White			436	6,200
. G. Pollock			440	6,500
ua Rhodes			440	6,500
. E. Fitzgerald			440	6,500
es S. Dunham			440	6,500
. Wallace			445	6,700
i			458	6,800
Total		323,000		45,700
1907				
lon Parks	552	10,000		
e Garretson	540	10,000		
hew Andrews	552	10,000		
n Kennedy	552	10,000		
mas Lynch	600	12,000		
. McIntosh	540	10,000		
y Phipps	600	12,000		
F. Baker	600	12,000		
es O. Jenkins	524	9,000		
. Morse	552	10,000		
l Ames	552	10,000		
Sullivan	552	10,000		
Bope	552	10,000		
. F. Cole	605	12,000		
Mills	552	10,000		
en	574	11,000		
hockett	524	9,000		
J. Boland	500	8,000		
G. Munro	552	10,000		
T. Kopp	500	8,000		
Dunn, jr	524	9,000		
ock			440	6,500
ah			440	6,500
et			440	6,500
			440	6,500
N. Ohl			440	6,500
a			440	6,500
ic			440	6,500
			440	6,500
B. Davock			460	6,800
Hubbard			440	6,500
Thompson			458	6,800
Total		212,000		72,100

STATEMENT No. 3.—*Showing length and capacity of all Great Lakes American freigh vessels constructed since and including 1900*—Continued.

Name.	First class.		Second class.	
	Length.	Capacity.	Length.	Capacit
1908.				
M. A. Bradley	480	7,500	....	....
Thomas Barlum	500	8,000	....	....
Caldera	524	9,000	....	....
B. F. Berry	569	10,500	....	....
J. E. Upson	524	9,000	....	....
A. W. Thompson	524	9,000	....	....
A. E. Nettleton	545	10,000	....	....
Wm. H. Wolff	524	9,000	....	....
Howard M. Hanna, jr	500	8,000	....	....
Harry A. Berwind	557	10,000	....	....
Wm. Livingstone	557	10,000	....	....
James Corrigan	550	10,000	....	....
Daniel B. Meacham	550	10,000	....	....
Fred G. Hartwell	524	9,000	....	....
Chas. W. Kotcher	....	....	440	6,
Wainwright	....	....	440	6,
J. H. Brown	....	....	452	6,
John A. McGean	....	....	440	6,
Wm. H. Truesdale	....	....	452	6,
Rufus P. Ranney	....	....	440	6,
J. F. Durstein	....	....	452	6,
Honduras	....	....	256	2,
Normania	....	....	440	6,
Adam E. Cornelius	....	....	440	6,
Total	....	129,000	....	61,
1909.				
Alva C. Dinkey	600	12,000	....	....
Eugene J. Buffington	600	12,000	....	....
La Belle	524	9,000	....	....
John J. Barlum	524	9,000	....	....
Isaac M. Scott	524	9,000	....	....
G. A. Tomlinson	524	9,000	....	....
J. S. Ashley	524	9,000	....	....
Shenango	607	12,000	....	....
Wm. B. Dickson	605	12,000	....	....
Theodore H. Wickwire	....	....	464	6
Elpena	....	....	374	5
Andrew S. Upson	....	....	400	5
Benjamin Nobel	....	....	256	2
Clifford F. Moll	....	....	464	6
Denmark	....	....	460	6
Total	....	93,000	....	33
1910.				
Wm. B. Schiller	600	12,000	....	....
John P. Morgan, jr	600	12,000	....	....
A. A. Augustus	524	9,000	....	....
Leonard B. Miller	524	9,000	....	....
John P. Reiss	524	9,000	....	....
John B. Cowle	545	10,000	....	....
Chas. B. Hutchinson	524	9,000	....	....
Joseph Wood	524	9,000	....	....
A. M. Byers	524	9,000	....	....
Peter Reiss	524	9,000	....	....
Chas. S. Price	524	9,000	....	....
E. H. Utley	524	9,000	....	....
Harry E. Yates	550	10,000	....	....
Theo. Wickwire, jr	550	10,000	....	....
W. J. Olcott	605	12,000	....	....
Willis L. King	600	12,000	....	....
Norway	524	9,000	....	....
Ontario	....	....	465	6
Champlain	....	....	465	6
St. Clair	....	....	465	6
Total	....	168,000	....	2

TATEMENT No. 3.—*Showing length and capacity of all Great Lakes American freight vessels constructed since and including 1900*—Continued.

Name.	First class.		Second class.	
	Length.	Capacity.	Length.	Capacity.
1911.				
m. P. Palmer	600	12,000		
m. C. Agnew	552	10,000		
os. Walters	600	12,000		
incy A. Shaw	524	9,000		
e Harvester	545	10,000		
Total		53,000		
1912.				
. J. M. Schoonmaker	617	14,000		
J. Snyder, jr.	617	14,000		
vidson, Louis R.	524	9,500		
rell, Jas. A.	600	12,000		
Total		49,500		

ATEMENT No. 4.—*Showing data regarding all first and second class Great Lakes American freight vessels constructed since and including 1900.*

Year.	Capacity, first class.[1]	Capacity, second class.[2]	Total capacity.	Per cent, first class.	Per cent, second class.
	Tons.	*Tons.*	*Tons.*		
	41,000	121,600	162,600	25	75
		126,400	126,400		100
		134,600	134,600		100
		187,100	187,100		100
	18,000	36,300	54,300	33	67
	226,000	5,500	231,500	97.6	2.4
	323,000	45,700	368,700	87.6	12.4
	212,000	72,100	284,100	74.6	25.4
	129,000	61,900	190,900	67.6	32.4
	93,000	33,600	126,600	73.5	26.5
	168,000	20,400	188,400	89.1	10.9
	53,000		53,000	100	
	49,500		49,500	100	

[1] First class includes all vessels 480 feet or over in length.

[2] Second class includes all vessels under 480 feet in length.

STATEMENT No. 5.—*Showing the amount expended by the Federal Government on all coast and Gulf ports costing over $1,000,000; annual tonnage of water-borne freight; value of annual tonnage of water-borne freight; cost of improvement; cost of improvement per ton of annual tonnage; ratio of cost of improvement to value of annual tonnage; cost of maintenance; cost of maintenance per ton of annual freight.*

Location of project.	Annual tons.	Value of annual tonnage.	Cost of improvement.	Cost of improvement per ton of annual tonnage.	Ratio of cost of improvement to value of annual tonnage.	Maintenance.	Cost of maintenance per ton of annual tonnage.	Report of Chief of Engineers, 1912.		Remarks.
								Volume.	Page.	
					Per cent.					
Bayou Plaquemine and Grand River and Pigeon Bayou, La.	801,419	$7,893,634.00	$1,970,053.54	$2.46	25	$15,538.01	$0.02	1	651	Complete.
Galveston Harbor, Tex	3,793,273	427,016,385.00	11,533,000.00	3.04	3	19,358.02	.05	1	688	Do.
Galveston Channel, Tex	3,111,884	371,756,124.00	1,520,000.00	.48	.4	101,015.23	.03	1	690	Incomplete.
Aransas Pass, Tex	8,880	863,000.00	2,278,750.00	253.22	264	25,000.00	.27	1	718	Do.
Harbor of Sabine Pass and Port Arthur Canal, Tex	2,443,962	49,864,181.00	5,076,550.00	2.08	10	25,958.68	.01	1	735	Do.
Portland Harbor, Me	3,162,024	96,751,740.00	1,622,736.49	.51	2	4,150.68	.01	1	54	Complete.
Providence, R. I	3,887,853	103,313,720.63	2,471,553.83	.64	2			1	120	Incomplete.
Bridgeport Harbor, Conn	1,007,147	42,043,640.99	1,021,400.00	1.01	2	14,865.00	.01	1	162	Complete.
Bay Ridge and Red Hook Channel, N. Y	4,502,000	232,562,000.00	2,500,000.00	.55	1			1	229	Incomplete.
Staten Island Sound, N. Y. and N. J., between N. Y. and N. J.	17,800,977	263,352,020.00	1,059,937.36	.06	.4	96.11		1	258	Complete.
Wilmington, Del	859,736	68,674,051.00	1,496,952.00	1.74	2	61,985.79	.07	1	310	Do.
Norfolk, Va	14,445,112		2,620,282.00	.18		61.06		1	390	Do.
Winyah Bay, S. C	314,503	5,322,569.00	2,927,991.67	9.31	55	15,991.67	.05	1	468	Incomplete.
Charleston Harbor, S. C	1,163,732	77,388,475.00	5,031,650.00	4.32	6.5			1	479	Do.
Savannah Harbor, Ga	2,954,814	246,678,077.00	10,111,747.64	3.42	5	104,200.00	.035	1	484	Do.
Brunswick Harbor, Ga	704,252	44,506,731.00	1,349,900.00	1.72	3	24,993.59	.03	1	510	Complete.
Fernandina Harbor, Fla., and Cumberland Sound	511,133	10,113,836.00	3,607,514.40	7.07	36	61,893.58	.12	1	518	Do.
Hillsboro Bay, Fla	1,637,676	29,904,179.00	1,790,180.13	1.09	6	20,000.00	.01	1	554	Incomplete.
Pensacola Harbor, Fla	(1)	22,375,026.00	1,355,956.94		6			1	592	Do.
Mobile Harbor, Ala	2,203,712	59,027,974.00	6,981,630.60	3.17	12	7,095.40	.002	1	607	Do.
Los Angeles, Cal	1,720,711	77,704,843.00	[2] 3,405,250.00 [3] 2,333,174.00	3.33[1]	7.5			1	1140	Do.
Oakland Harbor, Cal	3,796,683	154,224,950.00	3,963,803.00	1.04	2.5			1	1153	Do.
Humboldt Harbor and Bay, Cal	770,560	15,408,860.00	2,855,671.06	3.70	19			1	1162	Do.
Sacramento and Feathers River, Cal	505,285	32,139,048.00	1,092,000.00	2.16	3	25,000.00	.05	1	1166	Do.
Entrance to Coos Bay and Harbor, Oreg	363,008	7,097,617.00	1,375,750.00	4.54	19	5,000.00	.02	1	1179	Do.
Gray Harbor and Bar Entrance, Wash	710,840	6,092,836.00	2,660,000.00	3.74	43.6	354.16	.004	1	1234	Do.
Total	73,127,176	2,452,075,516.00	86,013,434.66							
Average Federal cost of 25 salt-water improvements per ton of annual tonnage.				1.18						

annual tonnage; ratio of cost of improvement to value of annual tonnage; cost of maintenance; cost of maintenance per ton of annual freight.

Location of project.	Annual tons.	Value of annual tonnage.	Cost of improvement.	Cost of improvements per ton of annual tonnage.	Ratio of cost of improvements to value of annual tonnage.	Maintenance.	Cost of maintenance per ton of annual tonnage.	Report of Chief of Engineers, 1912.		Remarks.
								Volume.	Page.	
					Per cent.					
Alabama River, Fla	110,231	$8,253,948.00	$1,064,000.00	$9.67	13	$25,000.00	$0.23	1	597	Incomplete.
Allegheny River, Pa	1,374,626		2,012,657.33	1.46				1	895	Do.
Arkansas River, Ark., from mouth to mouth of Grand River.	81,371	1,085,018.00	3,059,899.44	37.77	282	32,115.95	.40	1	781	Complete.
Big Sandy River, W. Va. and Ky	181,770	1,436,375.00	1,701,700.47	9.35	118.5			1	922	Incomplete.
Canal at the Cascades, Columbia River, Oreg., 4.5 miles	41,778	3,034,315.00	3,825,629.48	91.09	126	720.00	.66	1	1198	Do.
Cape Fear River at and below Wilmington	1,063,908	58,933,962.00	5,528,228.92	5.20	9	75,000.00	.07	1	458	Do.
Chattahoochee River, Ga. and Fla., Columbus to mouth, 139 miles	117,115	15,784,029.00	1,037,930.78	8.87	6.5	52,000.00	.044	1	583	Do.
Columbia River between foot of Dalles Rapids and head of Celilo Falls, Oreg. and Wash	67,019	2,586,245.00	3,150,000.00	47.01	122			1	1194	Do.
Columbia River, 98 miles, and lower Willamette River below Portland, Oreg	8,000,914	83,157,608.00	3,105,135.47	3.88	4	129,602.39	.016	1	1213	Do.
Columbia River, mouth of, Oregon and Washington	2,449,297	52,104,230.00	11,145,294.94	4.55	21	80,251.82	.03	1	1218	Do.
Coosa River between Rome, Ga., and east Tennessee	40,840	558,492.00	1,802,583.20	43.98	323	11,868.51		1	600	Do.
Cumberland River, Tenn. and Ky., below Nashville, 193 miles	223,278	3,549,114.00	1,688,000.00	7.57	47	2,885.68	.01	1	860	Do.
Cumberland River above Nashville, 357 miles	181,029	4,087,748.00	3,312,500.00	18.30	81	5,185.36	.03	1	863	Complete.
Delaware River, Philadelphia to sea, 63 miles	25,786,180	1,209,878,741.00	17,216,534.86	.67	1	325,538.03	.01	1	283	Incomplete.
Des Moines Rapids Canal and Dry Dock	42,018		1,458,103.88	34.71				1	811	Do.
Detroit River, Mich	66,951,231	745,167,201.00	11,894,500.00	.18	1			1	1087	Do.
East River and Hell Gate, N. Y	45,331,216		5,983,341.45	.13				1	192	Do.
Fox River, Wis., 289 miles	170,313	736,617.00	3,884,406.55	22.85	527	5,717.47	.035	1	1001	Do.
Harlem River, N. Y	11,751,632	570,494,993.00	1,838,000.00	.16	.3			1	198	Do.
Houston Ship Channel, Tex	1,354,897	34,721,530.00	2,500,000.00	1.85	7	320,631.66	.24	1	696	Do.
Hudson River, N. Y	4,241,478	92,100,313.00	7,566,524.56	1.78	8	4,746.88	.001	1	209	Do.
Illinois River, Ill., 223 miles	173,529	3,557,150.00	1,635,837.81	9.40	46	15,897.70	.09	1	1020	Complete.
Illinois and Mississippi Canal, Ill	42,682		7,521,746.46	174.93		188,111.37	4.37	1	812	Incomplete.
James River, Va., mouth of river, 103.8 miles, at Richmond	472,537	27,004,595.00	2,362,500.00	5.00	9			1	403	Do.
Kanawha River, W. Va	1,392,788	4,512,758.29	4,295,863.14	3.08	28.5	198,878.68		1	917	Do.
Kentucky River, Ky	209,249	2,638,880.24	4,113,500.00	19.68	155	200,000.00	.96	1	925	Do.
Mississippi River between Ohio and Missouri River	369,295	20,776,266.00	15,894,999.98	43.07	76	303,197.08	.82	1	803	Do.
Mississippi River between Missouri River and Minneapolis, Minn., and St. Paul	2,081,566	38,928,961.00	17,108,965.40	8.22	44	2,128.91	.0009	1	807	Do.

STATEMENT No. 6.—*Showing the amount expended by the Federal Government in all river improvements of the United States costing $1,000,000 or over; annual tonnage of water-borne freight; value of annual tonnage of water-borne freight; cost of improvement; cost of improvement per ton of annual tonnage; ratio of cost of improvement to value of annual tonnage; cost of maintenance; cost of maintenance per ton of annual freight*—Contd.

Location of project.	Annual tons.	Value of annual tonnage.	Cost of improvement.	Cost of improvements per ton of annual tonnage.	Ratio of cost of improvements to value of annual tonnage.	Maintenance.	Cost of maintenance per ton of annual tonnage.	Report of Chief of Engineers, 1912.		Remarks.
								Volume.	Page.	
					Per cent.					
Mississippi River between St. Paul and Minneapolis, Minn.	40,000	$200,000.00	$1,916,600.00	$47.92	958			1	815	Incomplete.
Mississippi River, reservoirs at headwaters of	675,000	3,000,000.00	1,737,699.04	2.57	58			1	817	Do.
Missouri River, mouth to Kansas City	307,807	602,466.23	9,627,934.12	31.26	1,599	$81,215.71	$0.26	1	835	Do.
Missouri River, Kansas City to Fort Benton	63,204	479,949.00	5,325,504.65	84.54	1,109	300,000.00	4.76	1	841	Do.
Monongahela River, Pa	10,747,041		6,006,678.88	.56				1	890	Do.
Muscle Shoals Canal, Tennessee River	8,962	815,890.00	1,266,764.08	140.77	155	13,576,50	1.55	1	882	Complete.
Ohio River at Louisville, Ky., and head of Louisville & Portland Canal	1,243,050		3,324,168.86	2.67		119,649.21	.096	1	929	Incomplete.
Ohio River, general, 1,000 miles	12,046,294	82,074,878.77	9,052,354.47	.75	11	15,279.91	.001	1	883	Do.
Osage River, Mo	19,274	344,733.60	1,035,000.00	54.47	300	23,924.12	1.26	1	848	Do.
Passaic River, N. J	2,266,291	62,216,589.00	1,600,350.00	.71	2.5	5,000.00		1	254	Do.
Patapsco River and channel to Baltimore, Md., 20 miles	10,123,355	200,908,059.00	8,311,030.00	.82	4	28,764.65	.002	1	330	Do.
Pascagoula River, Miss	972,944	6,560,380.00	1,029,417.60	1.06	16	54,624.96	.06	1	626	Do.
Potomac River, Aqueduct Bridge to Giesboro Point, D. C., 5 miles	795,900	12,995,447.00	3,388,500.00	4.46	26	24,269.88	.03	1	364	Do.
Puget Sound, waterway connecting Puget Sound with Lake Union and Washington, Wash	598,157	2,628,439.00	1,280,000.00	2.14	48.7	5,078.91	.008	1	1248	Do.
Ouachita and Black Rivers, Ark. and La	165,389	5,561,044.00	2,906,869.00	17.61	52	23,298.00	.14	1	756	Do.
Red River below Fulton, Ark	171,946	4,512,487.00	2,693,377.50	15.08	60	113,898.66	.66	1	752	Do.
Saginaw River, Mich., 26 miles	236,636	2,342,254.00	1,418,750.00	6.00	60			1	1075	Do.
Ship channel connecting water between Chicago, Duluth, and Buffalo	61,498,884		3,365,000.00			4,743.24		1	1059	Complete.
St. Johns River, Fla., from mouth to Jacksonville	1,790,498	56,865,789.00	5,360,089.02	2.99	9	45,815.18	.025	1	524	Incomplete.
St. Marys River at Falls, Mich	53,477,216	595,019,844.00	12,932,822.19	.24	2			1	1061	Do.
Tennessee River, Chattanooga to Riverton, Ala., 238 miles	208,420	3,876,063.00	7,085,842.11	34.00	177	9,521.47	.05	1	870	Do.
Yazoo River, mouth of, and harbor at Vicksburg, Miss	321,594	8,753,650.00	1,253,000.00	3.89	14	10,215.40	.001	1	768	Complete.
Total	331,017,738	4,034,847,052.13	239,626,145.14			1,048,578.82				
Average Federal cost of 50 river improvements per ton of annual tonnage				.73						

Government in improving harbors in the Great Lakes; annual tonnage of water-borne freight; value of annual tonnage of water-borne freight; cost of improvement; cost of improvement per ton of annual tonnage; ratio of cost of improvement to value of annual tonnage; cost of maintenance; cost of maintenance per ton of annual freight.

Location of projects.	Annual tons.	Value of annual tonnage.	Cost of improvement.	Cost of improvement per ton of annual tonnage.	Ratio of cost of improvement to value annual tonnage.	Maintenance.	Cost of maintenance per ton of annual tonnage.	Report of Chief of Engineers, 1912.		Remarks.
								Volume.	Page.	
					Per cent.					
Ashland, Wis.	3,568,149	$12,240,067.00	$569,500.00	$0.20	5	$1,150.00	$0.0003	1	957	Incomplete.
Ashtabula, Ohio	13,062,023	37,805,404.00	2,094,256.36	.16	5	5.50	....	1	1106	Do.
Buffalo, N. Y.	12,417,862	314,397,264.00	6,220,695.96	.51	2	5,726.08	.005	1	1115	Do.
Calumet Harbor, Ill., 11 miles	6,607,996	....	1,597,230.00	....	....	8,858.90	....	1	1011	Complete.
Calumet River, Ill. and Ind.	....	....	1,272,221.44	.41	....	21,639.62	.04	1	1013	Incomplete.
Charlotte Harbor, N. Y.	940,472	2,454,600.00	833,610.00	.89	34	33,882.99	.04	1	1127	
Chicago Harbor, Ill.	4,025,576	....	3,611,005.00	.89	....	9,124.92	.02	1	1005	Do.
Chicago River, Ill., 13.28 miles	4,200,000	....	1,692,277.31	.40	....	7,240.59	.02	1	1008	Do.
Cleveland, Ohio	10,949,760	59,873,364.00	7,624,666.77	.70	15	43,194.42	.004	1	1101	Do.
Conneaut, Ohio	8,879,277	33,290,265.00	1,277,450.22	.17	4	680.00	....	1	1108	Do.
Duluth Harbor Basin, Minn.	30,672,846	236,056,373.00	7,313,203.69	.24	3.1	326,360.00	.016	1	947	Do.
Dunkirk, N. Y.	5,873	43,411.00	1,089,534.88	181.66	2,533	....	....	1	1114	Do.
Erie, Pa.	3,464,836	75,808,610.00	1,532,882.28	.44	2	1,167.62	....	1	1011	Do.
Fairport Harbor, Ohio	1,455,699	12,689,063.00	1,206,316.15	.83	9	680.00	....	1	1105	Do.
Frankfort Harbor, Mich.	756,505	22,591,504.00	502,475.44	.66	2	2,443.77	.003	1	1052	
Grand Haven Harbor, Mich.	641,816	65,668,660.00	1,068,943.07	1.67	2	31,475.24	.05	1	1035	Do.
Great Sodus Bay, N. Y.	55,693	169,495.00	607,489.75	10.84	358	27,214.16	.49	1	1120	
Green Bay, Wis.	751,326	7,669,500.00	602,130.89	.80	8	11,350.66	.01	1	979	Complete.
Harbor of refuge, Grand Marais, Mich.	13,600	554,580.00	535,723.32	38.28	96	6,014.54	.44	1	971	
Holland Harbor, Mich.	145,801	23,194,270.00	772,050.96	5.29	3	4,729.72	.03	1	1033	
Huron Harbor, Ohio	1,257,724	3,120,266.00	561,800.00	.45	18	6,243.67	.005	1	1097	Do.
Kenosha, Wis.	80,731	4,985,330.00	564,969.42	6.98	11	2,049.18	.02	1	998	Do.
Keweenaw Waterway, Mich.	2,146,617	78,861,611.00	1,375,237.68	.64	1.7	97,876.00	.045	1	963	Incomplete.
Little Sodus Bay, N. Y.	133,715	582,132.00	530,464.47	3.95	91	22,588.34	.17	1	1130	
Lorain Harbor, Ohio	6,454,267	18,374,177.00	1,218,284.37	.19	7	680.00	....	1	1099	Do.
Ludington Harbor, Mich.	1,865,272	108,564,055.00	1,582,128.71	.85	1	8,494.59	.04	1	1043	Do.
Manistee Harbor, Mich.	320,820	3,763,626.00	665,000.00	2.07	18	4,366.64	.01	1	1046	
Manitowoc, Wis.	1,437,229	65,723,230.00	946,812.72	.66	1	4,048.85	.003	1	988	Complete.
Marquette, Mich.	1,838,873	8,649,960.00	885,588.69	.48	10	8,943.03	.05	1	966	Incomplete.
Michigan City Harbor	27,063	....	1,824,338.92	67.41	....	32,849.32	1.22	1	1018	Do.
Milwaukee Harbor, Wis., including harbor of refuge	7,612.241	119,653,735.00	2,375,876.27	.31	2	5,258.08	.006	1	993	Complete.
Muskegon Harbor, Mich.	114,015	6,339,136.00	881,623.67	7.74	14	6,935.21	.06	1	1038	
Oswego, N. Y.	869,965	4,074,845.00	2,662,089.64	3.06	65	83,760.64	.10	1	1132	Incomplete.
Racine, Wis.	197,667	6,855,400.00	809,135.82	4.08	12	1,685.63	.01	1	997	Do.

STATEMENT NO. 7.—*Showing amount expended by the Federal Government in improving harbors in the Great Lakes; annual tonnage of water-borne freight; value of annual tonnage of water-borne freight; cost of improvement; cost of improvement per ton of annual tonnage; ratio of cost of improvement to value of annual tonnage; cost of maintenance; cost of maintenance per ton of annual freight*—Continued.

Location of projects.	Annual tons.	Value of annual tonnage.	Cost of improvement.	Cost of improvement per ton of annual tonnage.	Ratio of cost of improvement to value annual tonnage.	Maintenance.	Cost of maintenance per ton of annual tonnage.	Report of Chief of Engineers, 1912.		Remarks.
								Volume.	Page.	
					Per cent.					
Sandusky, Ohio	2,279,318	$6,579,624.00	$1,297,192.00	$0.57	19	$9,610.79		1	1095	Incomplete.
Saugatuck Harbor and Kalamazoo River	16,562	1,454,544.00	500,939.00	29.47	34	6,354.85	$0.31	1	1031	
Sheboygan, Wis	661,886	8,299,425.00	791,574.75	1.20	9.5	15,822.55	.02	1	991	Do.
South Haven Harbor, Mich	19,244	1,269,423.00	500,300.00	26.31	39	4,234.27	.22	1	1028	
St. Josephs Harbor and River, Mich	183,163	14,403,248.00	920,445.53	5.02	6	16,309.19	.09	1	1025	
Sturgeon Bay, Wis	571,773	13,074,061.00	639,462.40	1.12	5			1	982	
Toledo, Ohio	6,407,878	19,017,281.00	2,940,810.00	.46	15	23,110.09	.003	1	1091	Do.
Two Harbors, Minn., or Agate Bay	7,422,559	23,547,459.00	260,786.69	.03	1	14,871.00	.002	1	945	Complete.
Waukegan, Ill	213,925	2,085,200.00	690,796.76	3.23	33	11,121.90	.05	1	1000	Do.
Total	141,476,254	1,333,933,599.00	59,559,736.46							
Average Federal cost of 41 Great Lakes harbors				0.47						
CUYAHOGA RIVER AND OUTER HARBOR TONNAGE SEPARATED.										
Cuyahoga River above Cincinnati Slip	[1] 3,301,643		[2] 1,550,000.00	[2].47						
Cuyahoga River below Cincinnati Slip and lake front	[1] 11,389,558		7,624,666.77	.68						
Cuyahoga River above Superior Viaduct	[1] 5,206,714	58,504,000.00	[2] 1,550,000.00	[2].30						
Cuyahoga River below Superior Viaduct and lake front	[1] 9,484,487	128,808,387.00	7,624,666.77	.80						

[1] Tonnage for the navigation season of 1912.

[2] Federal cost on basis of city's offer of cooperation.

STATEMENT NO. 8.—*Showing cost of dredging Cuyahoga River from 1856*[1] *to 1912, inclusive.*

Year.	Amount.	Year.	Amount.
1856	$7,576.04	1888	$23,724.99
1857	14,486.57	1889	33,543.97
1858	9,565.40	1890	26,627.64
1859	100.00	1891	16,178.66
1860	3,604.99	1892	25,167.63
1864	829.00	1893	23,008.12
1865	2,040.98	1894	17,602.78
1866	27,910.32	1895	23,737.14
1868	47,129.60	1896	39,953.35
1869	106,090.93	1897	25,150.47
1870	14,448.25	1898	25,871.46
1871	13,248.00	1899	33,041.55
1872	19,115.40	1900	48,783.68
1873	40,669.75	1901	31,799.81
1874	20,749.48	1902	27,420.05
1875	21,322.35	1903	26,726.08
1876	96,487.11	1904	43,616.28
1877	86,636.09	1905	65,414.64
1878	74,262.08	1906	36,869.95
1879	39,161.20	1907	54,653.28
1880	44,527.67	1908	60,023.14
1881	56,766.57	1909	64,742.62
1882	31,974.78	1910	92,099.37
1883	35,475.28	1911	37,280.90
1884	38,544.67	1912	40,483.98
1885	26,000.51		
1886	24,195.61	Total	1,862,150.34
1887	15,710.17		

STATEMENT NO. 9.—*Showing cost of Cuyahoga River improvements from 1896 to 1912, inclusive.*

Year.	Widening and extensions.	Dock and bulkhead construction.	Land for widening.	Miscellaneous.
1896			$30,000.00	
1897	$44,424.64	$15,000.75	414,079.60	$1,873.45
1898	7,254.47			
1899	37,754.91	9,399.84	86,598.36	6,873.45
1900	23,760.81	32,307.03	122,000.00	9,914.72
1901	47,674.01	31,399.40	6,613.75	11,233.89
1902	39,479.96	1,601.63	55,750.00	16,288.38
1903	11,105.93	31,023.14		8,652.04
1904	2,555.73	28,448.08	16,000.00	11,435.75
1905	113,946.22	10,265.62		3,042.91
1906	62,354.52	17,319.46		2,919.55
1907		1,091.85		580.20
1908				925.90
909				15,775.88
910				11,871.55
911			14,435.46	7,816.96
912				13,568.84
Total	390,311.19	177,856.80	745,477.17	122,773.47

SUMMARY.

Total cost of dredging as shown by Statement No. 8	$1,862,150.34
Total cost of widening and extensions	390,311.19
Total cost of dock and bulkhead construction	177,856.80
Total cost of land for widening	745,477.17
Total cost of miscellaneous items	122,733.47
Total estimated cost of land for widening at Lake Shore & Michigan Southern Ry. bridge, all of which has been secured through exchange agreements	246,500.00
Grand total	3,545,028.97

---

[1] Figures for the years 1861–1863 and 1867 are missing.

Statement No. 10.—*Showing the length and capacity of the largest bulk freight vessels; average iron-ore cargoes; iron-ore and coal lake transportation rates; and iron-ore unloading charges, from 1900 to 1912, inclusive.*

Year.	Length of largest vessel.	Capacity of largest vessel.	Average iron-ore cargoes.	Contract iron-ore rates.				Unloading charges.	Contract coal rates.	
				Duluth to Lake Erie.	Marquette to Lake Erie.	Escanaba to Lake Erie.	Escanaba to Lake Michigan.		Lake Erie to Duluth.	Lake Erie to Lake Michigan.
	Feet.									
1900	498	8,300	3,783	$1.00	$0.95	$0.85	$0.45	$0.20	$0.50	$0.60
1901	450	7,000	4,459	.80	.70	.60	.42½	.19	.35	.50
1902	436	7,000	4,899	.75	.65	.55	.42½	.19	.35	.45
1903	469	7,300	5.668	.85	.75	.65	.55	.21	.40	.50
1904	560	10,500	5,272	.70	.60	.55	.45	.19	.35	.45
1905	569	10,800	6,101	.75	.70	.60	.50	.20	.30	.40
1906	602	12,500	6,973	.75	.70	.60	.50	.20	.30	.40
1907	605	12,000	7,516	.75	.70	.60	.50	.20	.30	.40
1908	500	8,900	8,325	.65	.60	.50	.45	.20	.30	.40
1909	605	11,500	7,777	.65	.60	.50	.45	.20	.30	.37
1910	604	12,000	7,155	.70	.65	.55	.50	.15	.30	.35
1911	600	12,000	7,178	.60	.55	.45	.40	.15	.30	.30
1912	617	14,000	7,740	.50	.45	.35	.30	.10	.30	.30

[LETTER OF THE CLEVELAND CHAMBER OF INDUSTRY.]

Cleveland Chamber of Industry,
Cleveland, Ohio, November 5, 1913.

At the meeting of the board of directors of the Cleveland Chamber of Industry, held Tuesday evening, November 4, the following resolutions were adopted:

Whereas there has recently visited the city of Cleveland a board of Federal engineers for the purpose of inspecting the Cuyahoga River, and considering whether or not Government aid should be extended in the improvement of said river; and

Whereas from newspaper reports, and other sources of information, it is learned that certain interests are still urging the so-called "route No. 1," and did so urge upon this board of Federal engineers; and

Whereas the adoption of "route No. 1" would change the plans of the Detroit-Superior high-level bridge, delay its construction for a year or more; and

Whereas the plans for the said high-level bridge have been approved by the Federal Government, by the county commissioners, and by the city of Cleveland, contracts let, and construction commenced; and

Whereas this bridge is of the utmost importance to the city of Cleveland, and will be the only high-level structure connecting the east and west sides, and will carry a traffic of immense magnitude; and

Whereas with no delay the bridge can not be completed before 1916, at which time traffic will be so congested upon the present inadequate viaduct, with its draw, that relief will be an imperative necessity: Therefore be it

Resolved, That the Cleveland Chamber of Industry, with a membership of 1,100 business and professional citizens, and voicing the sentiments and desires of 250,000 citizens west of the Cuyahoga River, hereby protests against any river improvement plan which shall in the slightest cause any change in the plans of the Detroit-Superior high-level bridge; and

Resolved, That a copy of these resolutions be mailed to Col. William L Black, chairman of the board of Federal engineers, and that we respectfully request that the river and harbor committee of the Cleveland Chamber of Industry be heard in the matter before any recommendation be made by the said board of Federal engineers.

Very respectfully, yours,

A. E. Hyre, *Secretary.*

The Board of Engineers for Rivers and Harbors.

[RESOLUTION PASSED BY THE COUNCIL OF THE CITY OF CLEVELAND, JUNE 5, 1911, AUTHORIZING THE APPOINTMENT OF A RIVER AND HARBOR COMMISSION.]

Whereas it is the suggestion of the United States War Department that the establishment of harbor lines for Cleveland's outer harbor east of East Ninth Street and within the shelter of the breakwater be now considered by some properly constituted local agency; and

Whereas for some time there has been agitation for the improvement of the Cuyahoga River within the city limits by widening and straightening to make it more accessible and beneficial to navigation: Therefore be it

Resolved by the council of the city of Cleveland, That the mayor be, and he is hereby, empowered to appoint a commission to be known as "The River and Harbor Commission of Cleveland, Ohio," which commission shall consist of not more than five members. It shall be the duty of the commission to consider and report to the mayor and city council on all matters connected with the establishment of such harbor line, the improvement of the outer harbor, and the straightening, widening, and otherwise improving the Cuyahoga River within the city limits; such consideration to be made in so far as practicable in conjunction with the United States engineers and the authorities of the State of Ohio.

[REPORT ON THE IMPROVEMENT OF LOWER CUYAHOGA RIVER.]

CLEVELAND, *January 20, 1913.*

THE COUNCIL OF THE CITY OF CLEVELAND, *City.*

GENTLEMEN: I beg leave to present herewith the report of the river and harbor commission dated January 20, addressed to the mayor and city council. This report was handed me to-day. I have not yet had time to acquaint myself with its detailed recommendations. I have been aware, however, from time o time of the patient and exhaustive consideration given to the city's harbor problems by this commission, and I recommend that its findings be given your careful attention.

Respectfully submitted.

NEWTON D. BAKER, *Mayor.*

REPORT OF THE RIVER AND HARBOR COMMISSION ON THE CUYAHOGA RIVER.

To the MAYOR AND COUNCIL OF THE CITY OF CLEVELAND.

GENTLEMEN: The river and harbor commission of the city of Cleveland, having oncluded its investigation of questions relating to the improvement of the Cuyahoga River, herewith presents its report as required by the council resolution:

PART I.—GENERAL.

Creation of commission.—The survey of the Cuyahoga River was authorized y the river and harbor act of Congress, February 27, 1911, and in pursuance hereof a detailed survey and estimate was made by Col. John Millis, United tates engineer in charge of the Cleveland district. Col. Millis's report is now n the hands of the Board of Engineers for Rivers and Harbors, United States rmy, at Washington.

For a number of years prior to the adoption of this act of Congress there ad been considerable agitation on the subject of river improvement and various rganizations and committees of local civic bodies, city officials, and Representatives in Congress had done much to enlighten the public on the need of ome improvement of a radical character in the inner harbor of the city. umerous trips of inspection of the river had been made under various uspices, so that many of our citizens were familiar with the problems presented. In order that there might be some definite plan of improvement suggested for the care of the lake front and the inner harbor, Brig. Gen. W. H. ixby, Chief of the Corps of Engineers, United States Army, suggested that a ty commission be authorized to study and investigate the various questions ertaining to the improvement of the lake front and the river.

In accordance with this suggestion the city council adopted a resolution on me 5, 1911, creating the Cleveland river and harbor commission, consisting of five members to be appointed by the mayor, with authority and direction to investigate and report to the mayor and city council on the questions involved in straightening, widening, and otherwise improving the Cuyahoga River, and with special instructions to act in conjunction, so far as practicable, with the United States engineers and authorities of the State of Ohio.

Work of the commission.—In pursuance to the authority granted by this resolution, Mayor Herman C. Baehr appointed the commission, which met and organized on June 22, 1911. The commission immediately began to hold numerous sessions and public hearings, records of which have been kept and are open to the inspection of anyone interested. These meetings have been held with the city officials, Government engineers, State authorities, and with civic organizations, property owners, railroads, steamship owners, carriers, and sailors. Your commission has also made personal investigations and examinations of numerous Great Lakes and Atlantic ports and harbors.

The commission has not undertaken to prepare detailed plans in order to carry on technical engineering studies. No appropriation was allowed for such purposes, although plans and surveys by the United States Government and city engineers have been at our disposal.

The commission has dealt with the various phases of Cleveland's river problems in the broadest sense and has outlined plans of improving and facilitating navigation in the river in a general way, indicating, however, in this report what it believes to be necessary to perfect the details of its recommendations.

At all times the commission has kept in view the need of developing the river valley as an industrial center with furnaces, mills, and factories, and with the consequent larger employment of labor.

PART II—HISTORY AND COMMERCE.

Movement of lake traffic.—The movement of traffic on the Great Lakes is largely carried on through trunk lines; that is, most of the cargoes are shipped between a few points in the upper lakes to a few points along the south shore of Lake Erie. The commodities are carried mainly in bulk, consisting of iron ore, grain, and flour down the Lakes, and coal taken up the Lakes. Most of the business is done between Duluth-Superior, on Lake Superior; Chicago and Milwaukee, on Lake Michigan; and Buffalo and the Cleveland district, on Lake Erie.

The Lakes provide the greatest system of inland water transportation in the world. The coast line in the United States on the Great Lakes is equal to one-third of the combined coast lines of the Atlantic, Gulf, and Pacific. The harbors of the Lakes are essentially river harbors, and this is especially true of Cleveland, where 37 per cent in bulk and 49 per cent in value of its total water traffic go through or above the improvement herein recommended, namely, above the Superior Avenue Viaduct.

This percentage in 1912 amounted to 5,206,714 tons, and in value amounted to $58,504,000.

Growth of lake vessels.—For economic reasons the size of freight-carrying vessels has greatly increased in recent years. Prior to the year 1890 boats of 200 to 300 feet in length, drawing 15 and 16 feet of water, were considered very large. Now over 50 per cent of the traffic is carried in boats 500 feet or more in length and draw 19 feet of water. A great many boats are 600 feet long, and two recently constructed are 617 feet in length. None of these boats can get through the Cuyahoga River at the place of improvement herein contemplated on account of the sharp bends, although a channel 21 feet in depth is maintained by the city.

The construction of these large boats, together with the opening up of vast iron-ore ranges in the Northwest and the development of the coal fields of the Southeast, have caused a great growth in the commerce on the Lakes. The records of traffic through the canals at Sault Ste. Marie indicate this growth. In 1885 there were but 3,000,000 tons of cargo passing through these canals, while in 1912 the freight amounted to 72,500,000 tons.

Cleveland's growth and commerce.—Cleveland is generally known to be a great iron center. Nearly half of its water-borne traffiic is iron ore. Its shipbuilding industry is also extensive. The United States Commissioner of Navigation, in his report for 1911, says that Cleveland is the largest steel-ship building center in the United States.

Cleveland's growth and commerce has been marvelous. The following tables indicate this:

Commercial growth.

	1899	1909	Increase.
			Per cent.
umber of establishments	1,349	2,148	59
apital	$93,000,000	$227,000,000	144
laries and wages	$30,000,000	$64,000,000	112
alue of products	$126,000,000	$272,000,000	116
umber of employees	57,868	96,968	68

Population.

Year.	Rank.	Number of people.
50	43	17,034
60	21	43,417
70	15	92,829
80	12	160,146
90	10	261,353
00	7	381,768
10	6	560,663

Uses of the river.—The following industries are represented along Cuyahoga's ater fronts: Furnace and steel plants, coal loading and dumping, shipbuilding, rain elevators, lumber yards, sand and gravel concerns, plaster and cement ompanies, storage and warehouses, fish industries, package and freight busiess, ironworks, petroleum, provisions and supplies, ice plants and street-end ocks.

These are all on or above the improvement herein recommended.

PART III.—DESCRIPTION AND REASONS FOR IMPROVING.

Description of river.—The immediate valley of the river through the city nd as far south as Thornburgh (10.5 miles from its mouth) is in the nature f a cut of irregular width and from 80 to 100 feet deep through a comparavely level plateau bordering the lake. The sides of this valley are steep, the ature of the material being clay and sand, which are easily handled by dredges r other machinery.

From the Superior Street Viaduct to the Erie Railroad bridge the width of e flats between the hills is about 3,800 feet. The river channel is very rooked, crossing the entire valley four times. From the Erie Railroad bridge Thornburgh the width of the flats is more irregular, varying from 3,000 et to 5,500 feet, but here the channel is much straighter, though there are everal short sharp bends, which can be easily corrected. The river could be ade navigable as far as Thornburgh. Beyond this point the valley is much arrower, and it probably would not be profitable to improve the channel.

The distance from the Superior Avenue Viaduct to the Erie Railroad bridge a straight line is 7,900 feet. By the river channel the distance is 17,420 et. The area of the adjacent flats is 686 acres. The distance from the Erie ailway bridge to Thornburgh in a straight line is 41,406 feet, while the river hannel between these points is 54,582 feet long. The area of adjacent flats 3,946 acres, of which 541 acres are now used for manufacturing purposes, aving 3,405 acres suitable for such use.

The navigable channel of the river extends at present to the southern line of e property of the Cleveland Furnace Co., about 5.2 miles from the mouth f the river. Above this point no improvements have been made. It is now ntemplated to straighten, deepen, and dock the river about 8,000 feet farther p the stream to a point near the Harvard-Dennison Bridge. It is contemlated, too, that at this place a new connection with the Ohio Canal will be ade. The State of Ohio has been engaged in improving the Ohio Canal from leveland to Dresden, Muskingum County, near the city of Zanesville, where nnection will be made with the Muskingum River. The United States Govrnment maintains 11 locks and dams in the Muskingum River, so that, with the completion of this project, there will be a through waterway from Lak Erie to the Ohio River at Marietta.

The docks along the river are generally constructed of wooden piling an timbers, with the exception of 6,800 feet of concrete dock, which is nearly al above the improvements contemplated. The river is crossed by 24 bridges, 1 of which have draw spans and 5 are stationary. Thirteen of the bridges carr railroad tracks.

Justification for improvements.—It is generally conceded that the sout shore of Lake Erie is the most favorable location for the manufacture of iro and steel. It is at the point where the cheap water transportation of ore meet with the more expensive rail transportation of coal and coke, these commoditie making up the bulk of raw materials used in the manufacture of iron an steel.

The necessity for cheap water transportation has become very evident t many men interested in the development of the Mahoning, Ohio, Alleghen and Monongahela Valleys, as is evidenced by the earnest efforts being made t build the Lake Erie and Ohio River ship canal, thus extending this metho of transportation for iron ore to the points above mentioned. The tendenc of the movement of freight rates is that the charges for water transportatio will become less and that of rail transportation will become greater in th future.

Cleveland is near the center of population and the center of manufacturin of the United States, and a glance at the map will show that it is the neares port on the Lakes to the Ohio River and the navigable waters of the grea Mississippi Valley. This makes it an excellent distributing point, and wi always be attractive to manufacturers if the proper facilities are given.

The union station project contemplates bringing all the railroads now buil and those to be built in the future to the lake front. This will make the oute harbor a particularly advantageous place for the transshipment of freight fro boats to cars and from cars to boats, offering excellent opportunities fo extensive railroad yards, warehouses, and stocking piles where both cars an boats can be handled most expeditiously, leaving ample space for park an recreation grounds that are so desirable.

The following table indicates the tonnage affected by the proposed in provement:

Tonnage of river.

	Ore.		Lumber.		Miscellaneous.		Total.	
	1911	1912	1911	1912	1911	1912	1911	1912
Superior Viaduct to Cincinnati Slip	34,000	156,033	122,863	118,061	158,871	1,630,977	1,746,734	1,905,0
Cincinnati Slip to Erie bridge	250,000	554,000	43,024	58,386	....	33,333	293,024	645,7
Above Erie bridge	1,576,177	2,184,653	....	1,200	347,109	470,071	1,923,286	2,655,9
Total	1,806,177	2,894,686	165,886	177,647	1,936,980	2,134,381	3,963,044	5,206,7

The total tonnage by water of the port of Cleveland for the year 1912 wa 14,476,038 tons, thus indicating that 37 per cent of the whole tonnage of th harbor will be benefited by the contemplated improvement. A much larg percentage than that indicated for the past year will undoubtedly be handle in the river above the Superior Avenue Viaduct hereafter.

The table of figures above quoted shows that the tonnage above the Er Railroad bridge had increased 38 per cent in the last year. In the distri above the Erie Railroad bridge enterprises now commenced and in contempl tion will cost $10,000,000, and it is reasonable to predict that within five yea there will be a tonnage in this territory of iron ore alone in the neighborho of 7,000,000 tons. Most of this will be manufactured into iron and steel in th river valley, but some will be shipped by rail and manufactured at other poin to the south. In addition to the ore there will be a large tonnage of manufa tured products distributed by water to all the lake ports and by way of th Welland Canal and the New York State Barge Canal to the ports of Sout America and those of England and other foreign ports.

If the unused part of the flats above the Erie Railroad bridge are improved
ı time to a corresponding degree, it would mean an additional expenditure of
50,000,000 in industrial plants and a total annual tonnage of 20,000,000 tons,
ith a corresponding increase in wages received by labor. A ton of ore turned
ıto manufactured product in our city means very much more to labor and to
ıe growth of the city than many tons merely transshipped from boats to cars
ıd carried away to other points.

To further this development it would seem, therefore, that the estimated ex-
enditure for the contemplated improvements would be fully justified. It
ıs been well said in a report of the International Congress of Navigation
ıat "harbor and transshipment facilities and the rapid circulation of the
eans of transport are as important for the economy of transportation as are
ced dimensions of canals and boats. The waterway and its boats should re-
ive progressively the improvements needed in order to continue to serve
ıe traffic which it develops." If Cleveland does not respond to this demand
her lake ports will take advantage of its negligence.

On July 2, 1912, the commission reported on the improvement of the upper
ver valley, in which a new channel of the river in the middle of the low-
nds would be made, opening up 3½ miles of river frontage to navigation.
his plan has been approved by the United States Engineers and by city offi-
ıls and is in the process of being carried out. This will open up the vast areas
valley as aforesaid; and in order to have the fullest possible development, it
ill be absolutely necessary to make the lower river improvement herein recom-
ended.

PART IV.—ROUTES FOR RIVER STRAIGHTENING.

General principles governing.—The commission, in studying the question of
e improvement of the river, naturally aimed to make the river as straight
possible on a comprehensive plan, which would admit of future development
nsistent with reasonable cost and the least interference to the present occu-
nts of the lower river flats. These flats are now occupied by various small and
ge industries, by lumberyards, planing mills, and by railroad main tracks
d terminals. The smaller industries do not require river frontage, nor do
railroad main tracks or local-freight terminals. The lumberyards are
coming less and less dependent upon the river. The desire of the commission
s been to interfere as little as possible with the large plants where ore is
nsshipped and with the main tracks of the railroads, realizing that the latter
important factors in the development of the city and should have all the
ilities possible accorded them for their present needs and future development.

Review of proposed routes.—The distance from the Superior Street Viaduct
the Erie Railroad bridge via the three original proposed routes is ap-
ximately as follows: Route No. 1, 9,555 feet; route No. 2, 10,340; route
. 3, 17,420 feet.

As route No. 3 contemplates the widening and improving of the present
nnel, the last figure of the above table may be taken as representing the
gth of the existing channel through the territory covered by the improve-
nts. For convenience of description the river is assumed to run north and
ıth.

Route No. 1 involves the relocation of the river channel, beginning at a point
out 400 feet south of the Superior Avenue Viaduct; thence extending in a
ıtheasterly direction and intersecting the present channel between the Cleve-
d, Cincinnati, Chicago & St. Louis Railway freight bridge and the Cleveland,
ıcinnati, Chicago & St. Louis Railway passenger bridge; thence in a south-
sterly direction intersecting the present channel about 400 feet downstream
m the Cincinnati slip. In connection with route No. 1 it is proposed to widen
present channel on the west side of the river at the Superior Viaduct and
the east side immediately upstream and downstream from the Cincinnati
).

Routes No. 1 and No. 2 afford the greatest saving in distance to the upper
ches of the river, route No. 1 having a slight advantage. Route No. 1 meets
h the least objections from the railroad officials, and is more central than
te No. 2 as regards low-lying lands and is better calculated to serve same.
would also relieve the present congestion at Irishtown and Columbus Road
ıd. It has the additional advantage over route No. 2 that more immediate
ef can be afforded, due to the fact that upon the completion of the first cut,

beginning at the present river channel south of the Superior Avenue Viaduc vessels can use it and secure the advantages due to the elimination of Iris town and Columbus Road Bend, while the balance of the river improvement being completed. This benefit can probably be realized by an expenditure about one-quarter of the total amount for the entire improvement, including t Mahoning Avenue cut.

In crossing under the new high-level bridge by route No. 1, the question bridge clearance and length of span arises. The Government regulations pr vide that the forelight on the large freighters shall be 40 feet above the ma deck, and that the rear light shall be 15 feet above the forelight. Freig boats running light at speed may have their main decks as much as 32 fe above the water, with probably a less height of the bow in the river, on accou of decreased speed. As the new bridge, with proper length of span, will off at least 80 feet clearance at the intersection with the channel of route No. only the rear light or mast of vessels will be affected. Lake vessels can a commodate themselves to the requirement of headroom suggested above means of shorter or adjustable masts, water ballast, or other expedien although a greater headroom would be desirable. No authority interviewed questioned by your commission has advanced a claim of serious detrime upon this point. It is assumed, however, that the new high-level bridge will made to conform with the requirements of navigation.

Route No. 2 would relocate the channel beginning immediately upstream fr the Columbus Road Bridge, and extending southerly along the westerly l of the Upson Nut Co.'s property, and intersecting the present channel abo 450 feet downstream from the New York, Chicago & St. Louis Railroad brid This route involves a widening of the present channel on the easterly side the river from Center Street Bridge to Columbus Road Bridge and on the we erly side of the river at the Columbus Road Bridge. Route No. 2, while slight better than route No. 1 as regards directness of channel, does not possess oth advantages of route No. 1, and in addition presents much more serious en neering difficulties. What seems to be an almost insurmountable obstacle the railroad situation at the south end of the proposed cut on this route.

Within a short distance of the intersection of Scranton Road and the p posed channel, we are confronted with 14 tracks of the Erie Railroad at th different elevations; also 9 tracks of the Cleveland, Cincinnati, Chicago & Louis Railway, 1 being a freight track to the central flats. Scranton Ro with its double-track street railroad, must also be taken care of. The follo ing of this route involves the relocation and readjustment of all these trac with the probable necessity for four long span bridges over the river, th bridges over Scranton Road, and one bridge carrying the Erie Railroad o the Cleveland, Cincinnati, Chicago & St. Louis Railway; in all, eight brid within a radius of about 450 feet. Even if the railroads cooperated in couraging such an improvement, it would appear that this nest of brid would be as serious an obstacle to vessel movement as a lock.

Route No. 3 contemplates the widening of the existing channel, with exception that a new channel about 900 feet in length would be necessary n the intersection of Dry Dock Street SW. and Cuyahoga Avenue SW.

Route No. 3 does not require a large appropriation at the outset, but co be worked out on the installment system over a long period of years. It not radical, and might be denominated as a compromise route. It does appreciably shorten the distance to the upper river, and has no decided vantage of economy to recommend it, the great cost of bulkhead and c struction and land condemnation, etc., being responsible for this result.

Cost of routes Nos. 1, 2, and 3.—The estimated cost for the three routes as follows: Route No. 1, $3,100,000 (exclusive of Mahoning Cut); route No. $3,300,000 (exclusive of Mahoning Cut); route No. 3, $3,854,000 (exclusive Mahoning Cut); Mahoning Cut, $1,700,000; route No. 3, $4,555,496 (carr above proposed Mahoning Cut).

The estimates for routes Nos. 1 and 2 are as given by the United Sta district engineer's office. The estimate of route No. 3 was furnished by city engineer. The Mahoning Avenue Cut begins at a point 500 feet above crossing of the present river by the central viaduct and extends to a point feet below the Erie Railroad bridge. At the present time this cut may or n not be taken into account in considering the general improvement. The shor cut at this point, as offered by route No. 3, might be considered as a substit in any attempt to reduce the cost and to minimize the disturbance of exist interests.

Miscellaneous routes.—Several other routes were submitted for the considera-
on of the commission by different interests and persons. The best of these
as a modification of route No. 2, proposed by a member of the commission,
hich contemplated throwing the cut farther west into the hill, avoiding some
the complications and disturbances to industries incident to route No. 2. It
ntemplated leveling off a large portion of the hill or plateau to the lower
vel, increasing the land available for manufacturing purposes, and utilizing
e large quantity of excavated material on the lake front, provided additional
y dumping area were available, which at present is confined to park lands.
ie railroad situation, however, as in route No. 2, still remained most for-
dable; otherwise this route presented many favorable features.

A suggested route by the officials of the Cleveland, Cincinnati, Chicago &
. Louis Railway presented at its first departure from the old channel an
trance angle so sharp as to seem prohibitive and furthermore would damage
e Baltimore & Ohio Railroad to a greater extent than route No. 1, and did
t shorten the distance to the upper river as much as routes No. 1 or 2. In
dition it would have annihilated the Erie Railroad freight depot and adjacent
cks, thus presenting many difficulties with no compensating advantages.

A suggested route by the officers of the Erie Railroad had the disadvantage
being one-third longer in cut than route No. 1, and while the proposed chan-
is, generally speaking, more direct and straight in reaches, yet these ad-
ntages are largely nullified and the practical efficiency limited by the sharp
vature of the entrance. There is also doubt about obtaining proper head-
m or clearance for vessels under the new high-level bridge. Many other
ections also suggest themselves.

A suggested route presented by the officials of the Great Lakes Dredge &
ck Co. is a modification of route No. 1, making the entrance to the new chan-
about 600 feet farther upstream than route No. 1, but it can not be regarded
feasible on account of the bad angle at the entrance to the new cut, necessi-
ing the partial winding of vessels before entering same.

PART V.—IMPROVEMENT RECOMMENDED.

he commission recommends route No. 1 of river improvement for the follow-
reasons, some of which have been previously stated:

irst. That it satisfies the general conditions which any and all routes should
et—that of permitting vessels of 600 feet in length to safely and expedi-
usly navigate to the upper river.

econd. That it affords the greatest saving in distance to the upper river, as
npared with routes No. 2 or 3.

hird. That it creates less disturbance with the existing railroad lines.

ourth. That it relieves the present congestion at Irishtown and Columbus
d Bend.

ifth. That it is more centrally located with regard to the lowlands than
te No. 2, or its modification, which the commission regards as the alternative.

ixth. That it affords immediate and partial relief upon an expenditure of a
e over one-quarter of the total cost.

n inspection of the relative distances to the upper river by routes No. 1, 2,
, as given in this report, would indicate (giving due weight to the advantage
emoval of obstructions as well as actual shortening of distance) that the
posed improvement of the river by route No. 1 would probably make a total
ing of time (trip and return) equal to the time it now takes a large vessel
each the Erie Railroad bridge, namely, from three to five hours. Route No.
so eliminates one-half of the present curvature of the river as well as two
wbridges, thus permitting vessels to proceed at greater speed than at present.
s previously stated, route No. 1 apparently offers the least disturbance to
railroads and has been much more favorably considered by them than
e No. 3.

e would suggest, as a relief to the hardships imposed upon them, the con-
ration of a plan submitted by Mr. E. B. Thomas, in charge of the harbor
ks, city engineer's office, to fill in Collision Bend with the excavated mate-
s and to carry West Third Street across the fill on a low viaduct, thus doing
y with the cost of maintenance of two city drawbridges and allowing the
Railroad to replace lost track facilities by extending on to the made land.
Cleveland, Cincinnati, Chicago & St. Louis Railway at Carter Road might
be relieved of the care and maintenance of an extra railway bridge across
river by filling up the old channel from said point to Collision Bend. This

would require the care of and readjustment of the lumber interests at the poi between Carter Road and the present channel. The quantity of lumber receiv by water is growing less year by year, and may ultimately reach a negligil amount. The lumber interests can be shifted as to locality with less har than can the railroads. It is assumed that the center pier of the Superi Avenue viaduct and the westerly abutment of the Baltimore & Ohio Railro bridge will be removed.

The commission fully realizes that any real improvement of the Cuyaho River at the present time can be met by objections of interests or parties n in sympathy with the idea of such development. No effective plan of bett ment can be proposed which is not open to such criticism. It is our belief th "the greatest good to the greatest number" demands the improvement of t Cuyahoga River in accordance with route No. 1.

Maps and routes.—Attached to this report is a map of the Cuyahoga Riv which shows routes No. 1, No. 2 and its modification, and No. 3.

Width of channel of route No. 1, dock lines, wharves, and slips, are details be decided upon and worked out by Government and city officials.

PART VI.—FINANCING PROJECT.

The carrying out of this improvement is for various reasons substantially extension of the outer harbor of the city of Cleveland, and is intimately relat to the work already done or projected by the Federal Government in harbor and in the Muskingum River and by the State of Ohio and in the enlar ment of the Ohio Canal. There is, therefore, a community of interest betwe the city of Cleveland and the Federal Government, which suggests that work of further improving the Cuyahoga River should be jointly performed the Federal Government and the city of Cleveland.

We therefore recommend that the city of Cleveland should assure the Fede Government of its willingness and ability to cooperate to the extent of 50 cent of the financial burden. With regard to the city's portion of the expen it recommends that all interests directly benefited shall be called upon to their share of the cost of the project.

PART VII.—ACKNOWLEDGMENTS.

The commission desires to express thanks to those who have rendered ass ance in these investigations and studies. The Government and city engine and others have freely rendered expert service. City officials, property own railroads, civic organizations, and citizens have lent every convenience possi The services of Dr. Charles S. Howe, formerly a member of the commissi were most efficient and helpful. Especial commendation is due Mr. E. Thomas, Cleveland Harbor engineer, for his painstaking efforts to serve commission.

Respectfully submitted.

(Signed) James H. Cassidy,
Edwin S. Griffiths,
Harry C. Gahn,
Walter P. Rice,
Augustus Mordecai,
Cleveland River and Harbor Commissio

Cleveland, Ohio, *January 18, 1913.*

[REPORT ON THE IMPROVEMENT OF THE UPPER CUYAHOGA RIVER.]

July 1, 191

To the honorable City Council, *Cleveland, Ohio.*

Gentlemen: The river and harbor commission to-day submitted to the ma a report in regard to changes in the Cuyahoga River above the present li of navigation. It is quite important that the recommendations made by commission be given early and serious consideration, so that contempla improvements in the upper river valley may not be unnecessarily delayed. this reason I am taking the liberty of forwarding this report to your honora body in the absence of the mayor, and would respectfully recommend tha be referred to the proper committee and to the city solicitor in order that nsideration may be given the subject and that you may take such action as your judgment seems proper before the adjournment for summer vacation.

Respectfully submitted.

W. J. SPRINGBORN,
Director of Public Service.

[REPORT OF CLEVELAND RIVER AND HARBOR COMMISSION.]

on. NEWTON D. BAKER,
Mayor of Cleveland, City Hall, City.

DEAR SIR: The Cleveland River and Harbor Commission begs leave to submit e following report in regard to changes in the Cuyahoga River above the esent limit of navigation:

Area of land in upper valley.—Between the present upper limit of navigation the Cleveland furnace and the point where the city limits touch the Cuyahoga ver there is an area of several hundred acres of comparatively level land. is land is crossed by the Cuyahoga River, the canal, and the following rail-ad tracks: Cleveland, Lorain & Wheeling Railroad, Valley Railroad, Cleveland lt Line Railroad, Newburgh & South Shore Railroad.

The greater part of this property is in the hands of private owners, although, course, the railroads own their own rights of way and some other small cts. If the river could be made navigable through this section the land uld be available as sites for iron furnaces, steel plants, and other large nufacturing industries which need water navigation and large amounts of ter for use. The present river bed is quite tortuous and lies near the sterly side of the tract. A large portion of this area belongs to the Cuyahoga lley Realty Co., although some parcels are owned by the Guardian Trust ., the Newburgh & South Shore Railroad Co., the Cleveland Terminal & lley Co., the Cleveland Paper Manufacturing Co., and a few other persons corporations. The Cuyahoga Valley Realty Co., representing its own interests d those of most of the other holders of this real estate, wishes to have a w river channel laid out which will run through the center of this tract tead of along the western edge. These property owners wish to give the d for the new channel in exchange for the present site of the river, and y desire to fill up the old river bed. Maps I and II, which accompany this ort, show the present and the proposed channels and the ownership of the eral parcels of land in the tract.

roposed new channel.—The proposed channel would pass approximately ough the center of this tract and would open up for manufacturing purposes land on either side, thus making the property more accessible by water l hence of greater value for manufacturing purposes. Such a channel, if avated to a depth sufficient for navigation, would be of great advantage h to the property owners mentioned above and to the city. It would be of antage to the property owners because it would enable them to dispose of ir property for manufacturing purposes at prices greatly in excess of sent values, and it would be of advantage to the city because the iron naces, steel plants, or other industries which located there would expend ge sums of money upon improvements, would add greatly to the manu-tured output of the city and would pay a large amount in wages each year its employees as well as a considerable sum to the city in taxes.

ost of excavating.—The cost of excavating the new channel would be con-erable, although a part of the work could be done by the sand companies, ich would be glad to secure the sand which lies not far beneath the present face, and hence they would excavate quite a large portion of the channel hout expense or even at a profit to the property owners. At the request of commission, Assistant City Engineer Thomas, in charge of river and harbor rk, has caused borings to be made along the line of the proposed channel. ese borings show that there is sand over quite a large portion of this route a depth of 10 feet below the present level of the river, and beneath that blue clay. In other sections the top soil is loam, while below that coarse d and gravel or wet lake sand are found. We submit Map III showing the nts where borings were made, and Map IV, showing the character of the beneath the surface.

roperty owners should pay expense.—It is the opinion of your commission t none of the expense of this excavation should fall upon the city. The nediate advantage would be to the private interests, and they should pay expense of making excavation and turn a practically finished channel over to the city for maintenance. In the present state of the city finances it wou probably be impossible to secure a bond issue for making this channel ev if it were considered wise for the city to do the work.

There is a great deal of level land beyond the city limits which will also available for manufacturing purposes should it ever be deemed wise to contin the navigable channel farther than the limits discussed in this report.

Federal act governs.—As the Federal Government has jurisdiction over navigable waters in the United States, it will be necessary for the Cuyaho Valley Realty Co. to obtain the consent of the Government through the Sec tary of War before any work can be undertaken. This statement is bas upon an act of Congress, approved June 13, 1902, entitled "An act making app priations for the construction, repair, and preservation of certain public wor on rivers and harbors, and for other purposes" (32 Stat. L., 371), where it provided inter alia: "Any person or persons, corporations, municipal or priva who desire to improve any navigable river, or any part thereof, at their or own expense and risk may do so upon the approval of the plans and specifi tions of said proposed improvement by the Secretary of War and Chief Engineers of the Army. The plan of said improvement must conform with general plan of the Government improvements, must not impede navigati and no toll shall be imposed on account thereof, and said improvement shall all times be under the control and supervision of the Secretary of War a Chief of Engineers."

Consent of State board.—As the proposed plan will vacate a part of present river channel, it may be necessary to secure the consent of the St board of public works. This commission is chiefly concerned with the cit part in proposed improvements and it has not made any investigation of t side of the question.

Conditions precedent to improvement.—Your commission recommends that the Federal authority can be obtained for this improvement the city give consent upon the following conditions which must be fulfilled by the Cuyah Valley Realty Co. and the other property owners interested, subject to the proval of the city engineer in regard to location, plan, and details of work.

1. That the excavation and all other work necessary shall be performed the owners of the property and without expense to the city.

2. That the consent of all property owners whose property is in any w affected by the new channel shall be obtained.

3. That the new channel from dock line to dock line shall be at least feet wide in every part and that at bends shall be wide enough to permit passage of a 600-foot vessel without making it necessary for any part of vessel to approach either dock line nearer than 15 feet.

4. That the new channel shall be excavated 80 feet wide to a navigable de of 21 feet and that the rest of the channel shall be excavated to a depth 12 feet.

5. That wherever necessary to prevent soil from washing into the chan bulkheads shall be constructed.

6. That when all of the new channel from the present limit of navigation the city limits is finished, or when any part of it is finished, with no intent of further excavation for a considerable period of time, the completed p shall be connected with the old river bed so that the water coming down river will flow through the new channel and not through the old, thus prev ing the new section from being filled with stagnant water which would be ob tionable from the standpoint of health.

7. That each section of the old channel as it becomes abandoned, on acco of connecting the new channel or any part of it with the old river bed, sl be filled up to such an extent as to prevent stagnant pools of water be formed.

8. That the Cuayhoga Valley Realty Co. and the other private prope owners shall assume all responsibility for any damage that may be done other owners along the proposed channel or affected by it.

9. That the Cuyahoga Valley Realty Co. and other property owners interes shall bind themselves, in a manner acceptable to the legal department of the c that at the option of the city council they will convey to the city a title to new channel and that they will surrender to the city whatever legal con they may have over it.

10. That work upon the new channel or upon a section of it connecting w the river at the present limits of navigation shall be begun within three ye from the date of the adoption of these conditions by the city council and s

e continuously prosecuted until its completion. That a section at least three-uarters of a mile in length above the present limits of navigation shall be nished within five years from the date of the adoption of these conditions by he city council.

Dock lines and maintenance.—We recommend that the city do not establish ock lines in this new channel until after the excavation has been completed nless it shall be determined by the city's legal advisers that no responsibility ill thereby be incurred by the city.

We further recommend that after the new channel is completed, or after any ection is completed and connected with the old channel, according to the conitions specified above, the city assume such responsibility for its maintenance nd control as it now exercises over the present navigable channel.

Respectfully submitted.

Charles S. Howe,
James H. Cassidy,
Walter P. Rice,
Edwin S. Griffiths,
Harry C. Gahn,
Cleveland River and Harbor Commission.

Cleveland, Ohio, *June 21, 1912.*

[REPORT ON OPENINGS AT BRIDGES ACROSS THE CUYAHOGA RIVER.]

he Council of the City of Cleveland,
City.

Gentlemen: I beg leave to transmit herewith for your information a report ated May 20, 1912, this day placed in my hands by the river and harbor comission of the city of Cleveland and dealing with the question of bridges across e Cuyahoga River.

The development of the upper river presents very grave and serious questions. s pointed out by the commission in its report the future industrial expansion d growth of our city, particularly in the location of steel plants and other rge manufacturing enterprises, must take place in large part along the upper ver, and in order that we may not some day awake to a condition of congestion d inconvenience, which will retard the development of the city's industries, it very necessary now to adopt a consistent and forward-looking policy with gard to both the erection of bridges hereafter to be placed across the river, d bridges which at present are erected and form greater or less obstructions navigation. In placing this report before you I am glad to make public knowledgment of the devoted and fruitful work which this important comission has rendered to the city, and to recommend that the report be referred an appropriate committee of your body in the hope that an ordinance may be afted which will embody the rules which the commission has recommended being the permanent policy of the city with regard to the construction of idges on the river.

Very truly, yours,

Newton D. Baker, *Mayor.*

Cleveland, *June 12, 1912.*

[REPORT OF CLEVELAND RIVER AND HARBOR COMMISSION.]

on. Newton D. Baker, *Mayor of Cleveland,*
City.

Dear Sir: The Cleveland River and Harbor Commission begs leave to submit e following report on bridges across the Cuyahoga River.

Obstructions to navigation.—We have consulted vessel owners, vessel captains, d the owners and managers of plants of various kinds located on the river, as ell as public officials, in an endeavor to get at the facts necessary before rmulating this report. In the future there will undoubtedly be a very great crease in the amount of traffic on the river. Many of the present iron and eel plants will be increased in size, and a large area beyond the present nits of navigation will be filled with furnaces, steel plants, and other great anufacturing concerns which need navigable water and considerable land. the past the development of the river valley has progressed very slowly. e of the great causes, if not the only cause for this, has been the difficulty navigation. The river has been so narrow, there have been so many and so

sharp bends and so many bridges that navigation has been exceedingly slo
and difficult. We have learned from the testimony of vessel owners and vess
captains that they would rather take a cargo for any other port on the lakes th
for Cleveland if the cargo is to be taken up the river, and that in the futu
the difficulties of navigation will doubtless result in an increase of rates.

Present bridge clearances.—There are now 17 bridges crossing the river b
tween Superior Viaduct and the head of navigation. Some of these are swi
bridges having a central pier in the middle of the river and openings from
to 68 feet on either side. In other bridges there are single openings whi
range from 101 to 160 feet. All of these bridges are to a greater or less exte
obstacles to the passage of vessels. We believe that in the future bridges shou
be constructed in such a way as to interfere as little as possible with navig
tion. It is manifestly impossible for us to prescribe details for their constr
tion, but it is our duty to recommend general rules which, if adopted, will e
able the proper officials to determine just what kind of a bridge should be bu
in any particular locality. We, therefore, recommend to you and the ci
council that the following rules be adopted and made the definite policy of t
city in regard to bridges over the river. These rules should apply only to su
bridges as are over that portion of the river which will be navigated by lar
vessels. Thus, if there should be a cut-off at any point, the bridges across t
arc of the river, of which the cut-off is the chord, would be excluded from t
operation of these rules. We have adopted 400 feet as the minimum leng
of vessels to be considered, because we are convinced that in a short time
vessels of less length than this will be carrying ore upon the Lakes, and bridg
which will accommodate 400-foot vessels will take care of all smaller on
We have adopted 600 feet as the maximum length to be considered, becau
there are now a number of 600-foot vessels upon the Lakes and the tenden
is to build more of this size. On account of the great cost of cut-offs and t
widening of the river at bends, it will be quite difficult to change the river so
to permit the passage of vessels more than 600 feet in length.

RULES FOR THE CONSTRUCTION OF AND CHANGES IN BRIDGES OVER THE CUYAHO RIVER.

1. That after the adoption of this report no bridges with center piers
constructed.
2. That on all parts of the river where it is possible for two vessels of 4
feet in length to pass, clear bridge openings at right angles to the thread of t
stream be not less than 150 feet in length.
3. That at or near curves of the river where it is impossible for two shi
each of which is 400 feet in length, to pass, the clear bridge openings at rig
angles to the thread of the stream be not less than 120 feet, but that in all ca
this opening be increased, if necessary, so as to permit the passage of a fire t
and a single vessel 600 feet in length without making it necessary for any p
of said vessels to come nearer than 15 feet to either abutment or to the docks
4. If a bridge is not at right angles to the thread of the stream the openi
should be increased so as to make the clear opening at right angles to the thre
of the stream equal to that recommended in rule 2 or rule 3.
5. The position of the abutments and the length of each from the shore shou
be determined in such a way as to make the passage of boats through the brid
as little dangerous as possible.
6. That all present bridges on the Cuyahoga River which do not conform
these rules be changed, within five years from the date of the adoption of t
report, so that they will meet these requirements, and that within the sa
period all center piers be removed.

If these rules are adopted, each application for a new bridge or for the rec
struction of an old one will come before the department of public service a
the engineer's department for action. Having a definite policy to follow, it w
be very easy for those departments to decide upon the kind of bridge, the len
of the opening, and the position of abutments.

Respectfully submitted.

CHARLES S. HOWE.
JAMES H. CASSIDY,
WALTER P. RICE,
EDWIN S. GRIFFITHS,
HARRY C. GAHN,
Cleveland River and Harbor Commission

CLEVELAND, OHIO, *May 20, 1912.*

Interpretation of rules.—In applying the rules which refer to the passing of vessels and for the erection of bridges over the Cuyahoga River, it is to be understood that said rules shall apply to condition of the river as they existed prior o the erection of bridges.

Adopted by the commission, October 28, 1912.

RECORD OF PUBLIC HEARING.

Arguments in re the participation of the United States Government to the extent of 50 per cent of the cost in the proposed improvement of the Cuyahoga River, at a meeting held before the United States Board of Engineers Wednesday, October 29, 1913, at 2 o'clock p. m., at the Cleveland Chamber of Commerce.]

Col. **Black**. The meeting will please come to order. The members of the board have been greatly impressed in their visit to Cleveland and in the things they have seen this morning. Cleveland is no new object of interest to us. Naturally or a great many years we have watched with very great interest your affairs, nd the solution of the various city problems that have been brought before you. We have heard for many years of the beautiful Euclid Avenue. We are greatly mpressed in the Civic Center as being one of the greatest steps taken by any municipality in the United States. We are interested in your transit or street ar problem, and this problem you have now of endeavoring to increase the ndustrial usefulness of your town is one that must appeal to us very greatly. As I suppose you know, we constitute the committee on appropriations of the United States Board of Engineers for Rivers and Harbors, a board which is contituted in accordance with a law of Congress, for the purpose of reviewing any ew project for improvement before it is acted upon or presented to Congress. n other words, whenever any new project or improvement in a river or harbor s desired by the people they persuade their Member of Congress to have an item laced in the river and harbor bill calling for a preliminary examination or surey, or both. Under that the Chief of Engineers directs the district engineer o investigate the subject and make a report. This is termed a preliminary exmination, and if the result of that preliminary examination goes to show that he project is one to be recommended to the Government to be taken up and exmined, then a survey or detailed examination is made. Then both the preminary examination and this detailed project as a result of the survey are referred to this Board of Engineers for Rivers and Harbors, whom we represent nd of whom we form the majority, and is gone over carefully by us with respect o its national aspect, to find out to what extent the expenditure of the money f the whole people is justified for the improvement of a particular locality.

Having made our investigations and recommendations as to the project, then our report goes to the War Department, and is reviewed again by the Chief of ngineers, and is commented upon by him, and is finally transmitted by the ecretary of War, with all of these comments, to Congress, where the matter is nally acted upon by the House of Representatives and the Senate, so that this reliminary step determines whether the project is worthy of recommendation, nd if so, to what extent the United States will assist. This must be decided rst by the district officer, and then, on his recommendation, must be decided by this board of review—the Board of Engineers of Rivers and Harbors. Your roject has been before us, and we have made some study of it. We have read he report, and we have read the very able report that you gentlemen have resented in pamphlet form, and we have now seen the situation on the ground. We will be very glad indeed to hear any additional arguments that may be had, articularly presenting to us the necessity for the General Government taking art in this, and the extent to which the General Government should be called upon to take part in this improvement, the improvement being primarily of ourse of local importance, and secondarily of State importance, and that seems o have been omitted from your program—the fact that the State of Ohio could nd should be called upon ultimately to assist in this matter, and then the eneral Government. I am told that there are a number of you who are preared to give us some addresses on this subject, and we will be very glad deed to hear from you. We would be glad to hear from the mayor of your ty on this subject.

Mayor **Newton D. Baker**. Gentlemen of the board, your long experience in ver and harbor improvements and problems almost disarms anyone who ndertakes to speak as an amateur on a subject of this sort. The mere inspection of the situation in Cleveland by you has equipped you with mo knowledge and information, by reason of your experience, than I could po sibly have, who have only regarded this subject, as the chief executive of th city, from its legal and commercial points of view. And yet it may not be ou of place for me to say that the question of improving the Cuyahoga Rive has been very much in the minds and in the hearts of the people of this cit for a long time. If we were breaking ground for a new city in Cleveland, it i quite certain that the lake front would be reserved for such public ownershi or control as would necessarily give common access to the great waterwa which nature has placed at our door. That has, however, been rendered in possible by what has happened in the past, and is probably rendered impossib by the natural conformation of the land. Lake Erie has a very high blu running along the entire lake front of Cleveland, and for manufacturing pu poses and for harbor and shipping purposes, the river, even though inadequa and tortuous, difficult of navigation, and difficult of access and suitable loadin and unloading facilities, has always been preferred by commerce, while the lak front has been monopolized in part, by railroad interests—private interests one sort and another, and by quasi private interests, like the railroads. Ou problem therefore has been to supplement the harbor facilities of Clevelan in anticipation of what must inevitably take place by the growth of the wate borne transportation.

This system of Great Lakes is scarcely used by the American people, in spi of the fact that substantially one-third of the entire freight tonnage of t country is carried on it. This is true chiefly because of the enormous tonna of bulk freight, like coal and iron, and the use of the Lakes for intercity tran portation has been almost neglected. And those who have had an opportuni to see the use made even of the smallest lakes in European countries will reali that we make no sort of adequate use of our Lakes as agencies of transportatio particularly among the States that border along them, or as links in throu transportation, and eventually, as the public appreciates the value of the Lak for that purpose, increasing demand will be made for larger harbor faciliti in all of the great cities along the Lakes. Now, Cleveland, by virtue of its loc tion, is destined to be, perhaps with the exception of Chicago, the greatest la port. It is the best meeting point for iron and steel, and as our age has us up the wood of our ancestors, it has become more and more an iron and ste age, in reference to the production of the steel itself, and the production cente more and more around the city of Cleveland. The use we make of the Lak now is perhaps well illustrated by a report which was handed to me to-day. shows the transportation through the canal—through the Soo Canal—for t month of September alone. It is substantially 11,000,000 tons. And the es mated tonnage for the year at the Soo this year is 75,000,000 tons. I cite the figures only because they are the latest, and not because I have the slighte notion that you gentlemen are in a state of uncertainty upon both the tonna and the importance of it upon the Great Lakes.

Now, in dealing with this problem it has been studied from a great ma points of view and by a great many different people. The public officers of t city of Cleveland have had it on their minds a great deal; the county of Cuy hoga, in which the city of Cleveland is located, has given it some study—bui ing bridges across the river chiefly, but not developing the harbor. The chamb of commerce, whose guests we were to-day at lunch, and to whom we owe t hospitality of this meeting room, have a committee composed of men who are i terested in shipping, and they are studying the problem all the time. The city Cleveland has a commission—the river and harbor commission—service up which is voluntary. They are not public officers in the sense of having any co pensation, and they have studied our harbor problem in a very comprehensi scientific way. In addition to that we have some land-owning interests th have foreseen what must take place in the upper Cuyahoga Valley, and they a interested, of course, in the development of the river in order to make accessi the lands which they have foreseen will be used for large industrial devel ment. In undertaking to present to you to-day the problem of the impro ment of the river we have thought to save your time and avoid duplication dividing up the subject among the various interests that I have referred to having given this problem some study, and the portion of it which has be reserved for me to speak on briefly is the question of the share which t General Government ought to be asked to take in this improvement.

It may be thought that this is a local improvement because so very much the length of the Cuyahoga that we have seen this morning is inside the lim of the city of Cleveland, but of course the interest of the United States in this project is to build up its commerce. The commerce of Cleveland is not local commerce. Our manufactories and mills are not engaged any perceptible portion of their time in manufacturing things to be used in the city of Cleveland; it is export commerce in a very large measure, and as we see it the interest of the people of the United States, in developing harbor facilities in this regard, will in fact place upon more favorable terms the most of the United States for that form of international competition which we must embark in, now that we have as a Government embarked upon that policy, in reducing, to some extent at least, the tariff schedules which were for a long time in force in this country. Rather than talk further on this subject directly, I ask your permission to read this rather than to summarize it, because it deals with the technical side of the roposition, and embodies everything that I could say:

What Cleveland asks is not that the United States shall take over the improvenent and maintenance of the Cuyahoga River, nor even its improvement alone; ior in reality are we asking the National Government to pay half the cost of ur river improvements. We ask that the Government pay about 20 per cent f the total expenditure upon our river, at less than one-third of the average xpenditure of the Nation per ton of commerce affected by its river and harbor vorks. We ask less in proportion to what we are ourselves doing than has been ranted by Congress to practically every harbor on the Lakes—proportionally ess, in fact, than the Government has ever been asked to do in any similar case, o the best of our knowledge and belief. We believe that Congress will be more han justified in appropriating the amount suggested, for the following reasons:

1. The purpose of the Government in making appropriations for waterways is *a*) the promotion of commerce and (*b*) control of freight rates and consequent eduction of transportation costs to the consumer.

That these purposes will be served by the Cuyahoga River project is demontrated as follows:

(*a*) The promotion of commerce. To-day practically none of the modern vesels of 500 feet length and over, which carry about two-thirds of the total tonage of bulk freight on the Lakes, can navigate the Cuyahoga River above the uperior Viaduct. The proposed cut would permit all of these boats to reach he head of navigation in the Cuyahoga. The probable effect of this improveent is indicated in some measure by the effect of the Jefferson Street cut. rior to 1906 (when this cut was completed) no boat of any size could go beond the Erie Railroad bridge, just below Jefferson Street, because of the sharp end at that point. In the season of 1912, 2,656,000 tons were carried above he Erie Railroad bridge. The increase over 1911 alone was about 38 per cent.

These facts would seem to justify the prediction of the river and harbor comission that within five years 7,000,000 tons of iron ore will be carried to the pper valley, and that if the industrial sites of the upper valley continue to be eveloped as rapidly as during the past few years, the total annual tonnage ffected by this improvement will ultimately be not less than 20,000,000 tons. ut such development will certainly be contingent upon adequate river improveent.

The primary benefit of the increased commerce, moreover, will be felt through large territory to the south of Cleveland. By no means all of the iron-ore unage of the upper Cuyahoga is smelted in Cleveland; a very considerable poron of it is transferred and goes by rail to districts in the South. And other mmodities to and from inland points will be handled on the upper river, no oubt. For example, a coal-loading plant of the Wheeling & Lake Erie Railway bove Jefferson Street has been unused largely because the road was not peritted to absorb the towing charges; this improvement will reduce or obviate wing costs.

(*b*) Reduction of transportation costs and consequent reduction of prices of on and steel products to the consumer.

The rates for carrying iron ore down the Lakes have been reduced more an 50 per cent since 1900. This reduction is due chiefly to the increase in the rrying capacity of boats and the improvement in handling equipment, which made possible by the modern types of boats. As we have seen, the Cuyahoga iver is not now able to take advantage of these modern economies. It is true at all the materials for the reduction of iron ore can still be assembled in d near Cleveland at much less cost than at other iron and steel centers. But e tendency to regulate transportation charges, making them proportionate the cost of the service, is likely to lead to the abandonment of the present flat rate to all Lake Erie ports, and the fixing of a different rate to each, base on the time in transit and other elements of cost.

I think I may interject a statement that we are rapidly outliving the tim when arbitrary charges will be accepted by the people, and we are coming int the time when the services performed will be the measure of the charge made

Now, not only is the navigation of the Cuyahoga in its present course ver slow and consequently costly, but the actual cost of transportation in the smal boats, which alone can navigate it, is much greater than in large boats; t carry a ton of iron ore down the Lakes in a vessel 400 feet long costs a least 8 cents more than in a vessel 600 feet long. No vessel of less than 50 feet length has been built since 1910, whereas in 1900 there were none longe than 500 feet. In 1900 every boat on the Lakes could navigate the Cuyahoga to-day barely half the bulk-freight carriers can reach the docks of our blas furnaces. Unless the Cuyahoga River is so improved as to permit the passag of modern boats, consumers of iron ore in the valley will soon have to pa much more to get their ore than consumers whose docks can be reached by larg boats; and the reduction in the cost of the product to the ultimate consume which is otherwise possible and probable, will become impossible.

Although pig iron now sells in Cleveland cheaper than in any other cente of production in the North, the cost of steel in Cleveland is figured on the Pittsburgh base price; that is to say, the Cleveland consumer pays for his stee the price charged in Pittsburgh, plus the freight rate from Pittsburgh t Cleveland. But if we can continue to enjoy the relatively cheap transportatio of the raw materials which makes this region economically the best for th production of steel, and if navigation is rendered easy to the great undevelope areas along the upper Cuyahoga, Cleveland will produce more and more stee and a Cleveland base price will almost inevitably be established in the nea future. The great steel works now being erected in the upper valley are sufficient assurance of the development which will result from adequate transportation facilities.

The saving to be realized by a Cleveland base price on steel will by no mean be confined to Cleveland. Not only will a large territory tributary to Cleveland get its steel cheaper, but the resultant savings on finished products of th steel will affect a very much larger territory. In fact, Cleveland consumer buy only a very small percentage of our finished steel products. By far th most of such products go all over the United States and abroad. The benef of cheaper steel following upon this river improvement will not, therefore, b only local, and probably not chiefly local.

2. Perhaps the best measure of the effectiveness of national expenditures fo waterway improvements is the cost of each improvement per ton of freigh afterwards handled at the locality of the improvement. A special committe of the city council has shown that the average cost of 117 Government rive and harbor improvements on the seacoasts, on the Lakes, and on rivers ha been 69 cents per annual ton of commerce affected. Assuming that the Unite States would pay 50 per cent of the cost of the Cuyahoga project, the cost t the Government per ton of commerce affected, estimating the increased tonnag conservatively, was shown to be 21 cents. In only 10 of the 117 cases o Government river and harbor improvements has the cost been less than 21 cent per annual ton. This shows conclusively that the Government will spend it money far more advantageously on this Cuyahoga project than on a great majority of river and harbor improvements which it has undertaken.

3. In most of the harbors improved by the United States the localities hav expended little or nothing upon their harbors. The Government has latel and very properly, leaned toward the policy of requiring local cooperation a least to the extent of providing terminals. Cleveland has improved and maintained the Cuyahoga River up to the present time without one cent of Government aid, spending more than $3,500,000 upon it. If the United States pay half the cost of this proposed improvement of the river, it will have pai scarcely 20 per cent of the total amount which will have been expended upo the Cuyahoga River by the time this project is completed.

4. It has been urged on various occasions at Washington that the policy the Government is to confine its harbor works, especially on the Great Lake to "outer harbors," leaving "inner harbors" or rivers to be improved by th local authorities. There may be reason for such a policy, but the fact remai that this rule has been honored "in the breach rather than in the observance In a very substantial majority of the principal Great Lakes cities and por having river harbors the National Government has expended large sums fo

he improvement or maintenance, or both, of these rivers or "inner harbors." Here are several cases, and not one of these cities has itself expended one cent upon its river to aid navigation:

Chicago: Thirteen miles of the Chicago River and its branches are under mprovement and maintenance by the United States, at a cost to date of more han $1,500,000. (The Chicago sanitary district has made large expenditures for canalizing the river and changing its direction of flow, but nothing has been expended by the city for navigation purposes.)

South Chicago: The Government has dredged and maintains the Calumet River for a distance of 11 miles from its mouth, at a cost to date of $1,200,000.

Duluth-Superior: The Government has dredged and maintains a channel in he St. Louis River to the upper limits of both cities, a distance of 20 miles from the original harbor entrance.

Toledo: The Government has dredged and maintains the Maumee River for distance of about 4 miles of "inner harbor," or city river frontage.

Black Rock Channel, Buffalo, to North Tonawanda: To reach a distance with ess tonnage, present and prospective, than the upper Cuyahoga the Government s expending $4,500,000 on this canal.

5. The Cuyahoga River is the northern terminus of the Ohio Canal and in act a section of the canal. The Muskingum River forms the southern section f the canal and forms its connection with the Ohio River. On the Muskingum River, in improvements and maintenance, the Government has spent more than 2,000,000, and the Government engineers in charge report that it is believed hat the expenditure has had "no material effect" on freight rates or commerce.

Summary: By undertaking to provide half the cost of the proposed Cuyahoga River straightening the United States Government will—

(1) Promote a large increase in the commerce of Cleveland and a large tributary district and probably effect a cheapening of the cost of steel for a large ection, as well as a cheapening of the cost of a large output of steel products o consumers everywhere.

(2) Produce these effects at a cost per ton of commerce affected which is ot one-third of the average cost per ton of Government river and harbor mprovements.

(3) Pay not more than one-fifth of the total cost of improving and maintaining the Cuyahoga River.

(4) Do for the city of Cleveland far less proportionately than the National Government has done for most of the other cities of the Lakes having river arbors.

(5) Assist in the improvement of the northerly terminus of the Ohio Canal t a less cost than has been incurred in the improvement of the southern terminus, which can not compare with the Cuyahoga in commercial importance and alue to the Nation.

Surely if the Government is justified in improving the Muskingum, which is he lower end of the Ohio Canal, and its outlet to the Ohio, at any such large xpenditure as has been made, the northern end, which is the Cuyahoga River, nd which for reasons quite apart from the fact that it is a section of the Ohio Canal, which would justify a very large expenditure, the Government would be ustified in cooperating with the city in carrying forward this great improvement.

Now, it has been suggested to me this morning that perhaps the policy of the Government was such that it might be thought wiser not to enter into cooperation or a copartnership arrangement with the city, but would make some arrangement like this: That maybe the Government might undertake to do the redging, and perhaps build the bulwarks or carry forward some part of the work in that connection, if we undertook to appropriate the right of way for the mprovement.

I would not have the capacity, if I had the time, and I have not had either he time nor the capacity since that suggestion was made, to undertake to say ow far that sort of a fusion would lead to solve the financial problem that is resented.

Cleveland, like every other city in the Middle West, is rapidly growing; it as had to pledge its credit very extensively to get the money necessary to keep p with its growth, and the project of financing a river improvement of this ind is a troublesome one to a city burdened as all of our Middle West cities re. Our invitation to the Government therefore is that, having in view the rge commercial aspects of the Cuyahoga River as a port of entry for iron ore and lake transportation, situated as it is in a city which substantially control navigation on the Great Lakes, for the control of this navigation is centered i Cleveland, being, as Cleveland is, destined to be the great center of lake transportation—our invitation to the General Government is to look with as muc favor upon our project and to extend us whatever aid in the judgment of you board is proper, looking to the interest of the general country in this improvement.

I am obliged to be absent during the rest of the discussion; I apologize wit very much regret that I am obliged to go, and in my absence I have asked M Springborn, director of public service, to indicate to the members of the boar those whom it has been thought had special points to speak on.

Col. Black. We beg to thank you very much for your courtesies, and beg t thank you also for your very able address.

Mr. Springborn. I think Mr. Pickands, representing the shipping interests, o the navigation interests, ought to speak, and I call on Mr. Pickands.

Mr. Pickands: Mr. Chairman and gentlemen, I will only attempt to cove and not very fully, the question of the size of the ships on the Lakes with relation to the harbor, and the effect of the size upon the cost of transportatio The limit of the size of ships on the Lakes is well known to be practicall the limit of the canals at St. Marys Falls. The boat which is the accepted typ of boat to-day seems to be 605 feet in length, 58 feet in width, and about 3 feet in depth. The length in determined largely by the width, and the widt by the width of the canals. There are a few boats which have already antic pated the completion of the new canal at the Soo and have been built 64 fe in width. There are a few others which were built about 60 feet in width few years ago. However, this anticipation has not proven satisfactory, a they are confined in their operation to the use of the Poe Lock, and on severa occasions, when the Poe Lock was out of commission, these boats were con pelled to await its reopening. The accepted type now is the boat which can us either the Poe Lock or the Canadian Lock. Upon the completion of the ne lock at the Soo, I believe some time next year, I look without any doubt for development in the size of the ships, up to such a size as can use alternativel the Poe Lock or the new lock, and I have no doubt that we will shortly aft the completion of the canal be navigating the Lakes with boats probably 65 feet to 675 feet in length, and from 64 feet to 70 feet in width. As the mayo stated, the tendency has been very strong within the last 10 years, from the s called 5,000-ton boat to the boat of ten or twelve thousand tons. The traffic o the upper river at the present time is limited practically to boats of seven eight thousand tons capacity. There have been cases where with great dela freight boats of larger size have been taken up there or brought down, b the practical commercial limit of the size of these boats is about 7,000 ton and I think by far the greater portion of the tonnage which goes to the upp river goes in boats of about five or six thousand ton classes, whereas the bul of the business on the Lakes at the present time is being done in boats of te to twelve thousand tons.

It has been figured that the difference in cost of carrying freight in boa of the smaller class as compared with the larger is about 8 cents a ton. T difference in unloading cost does not correspond absolutely to the size of t ship, but as a general proposition the smaller ships are older ships, and old ships, particularly the ones which were designed and built prior to the adve of modern unloading machinery, are consequently not adapted so well to th use, and are consequently more expensive to unload. This is only partially tru as there are boats of the smaller size which are more readily unloaded tha some of the larger size, but in general that applies.

I think so long as there is a handicap in reaching the upper river valley of t Cuyahoga, either as to being limited in the size of the ships that can get the or being limited in the draft of water at which they can go there, or by imposi upon them delays in following the tortuous channel, or by excessive towi charges to and from the industries of the upper valley, the terminal doc which are handling material for shipment to the upper valley are confronte with the danger at any time of being asked to pay a differential rate of freig as against delivery of the same material at the water front. That, so far I know, was not mentioned in the past, but it only requires the proper conditi of lake commerce; it only requires the demand for vessel tonnage to be slight in excess of the supply, when vessel owners will demand extra compensati for going to the upper waters of the Cuyahoga River, and whenever that tak place the manufacturing interests located there, and those who are taki

ieir raw materials over the rehandling docks located there, will immediately
e put at a disadvantage, and will result in increased cost of production, which
ie consumer will ultimately have to stand.

In general, from the point of view of the size of the ship and cost of service,
is safe to say that whatever is permitted to remain in the way of a handicap
gainst the industries and docks located in the upper river, remains as a men-
ce there of a higher rate of freight, or an influence which will defer a possible
wer rate of freight.

Mr. Springborn. I would like next to present Mr. Croxton, of the Cleveland
urnace Co.

Mr. Croxton. It is hardly necessary to speak to this board or these gentlemen
the subject of the kind of a harbor we have, but for a number of years the
udy of this harbor situation has brought to my mind several peculiar facts in
lation to the Cleveland Harbor. The first fact is that our harbor situation
vides itself naturally into two classes. The transportation or the forwarding har-
r, which has naturally come to pass, is the outer harbor, and this the Govern-
ent has protected with a breakwater, and the city is going forward and ac-
uiring land and acquiring rights as fast as they can, so that the iron ore which
mes to Cleveland, and the coal, and package freight, and passenger freight,
d all sorts of diversified material, will be forwarded and transported in the
ter harbor—that is, it will come in on the boats to be unloaded and be subdi-
ded into carloads, and transported all over the southern or eastern part of the
nited States. All of the material that has come down from the Northwest,
that has accumulated from the mammoth establishments at Youngstown,
ttsburgh, and the Wheeling and Mahoning Valleys, will be transported into
eveland, and will be transferred here into boats and make the run to Duluth,
ere, perhaps, to be transferred again into cars to go still farther west. A
ry large saving is thereby effected in the total cost of freight, and that is one
the most important things that can be accomplished.

Some years ago I remember seeing a statement that the clearance of the di-
rsified freight—the unclassified stuff—that went through the Soo Canal was
any times more in value than the iron ore. I am not prepared to show just
hat that is to-day, as I haven't the recent figures. To-day the city has taken
ld of our outer harbor, and individuals have taken hold of it, and the break-
ater is sufficiently completed so that Government expenditures are well toward
nclusion. Now, in this same harbor, the nature of the bluff, the nature of
e land, lack of land area, the smoke nuisance, and a thousand and one other
fficulties, make it impossible for large manufactories and other plants to be
cated on the outer harbor. There have been, in times gone by, plants located
ere, but they have been removed. With that in view, it becomes necessary to
nsider the matter of a producing harbor, and by that I mean the place where
e freight coming down from the Northwest or from the east of Buffalo, and
her points as may be, is brought, and is consumed and changed in its form
to a finished product, and is again sent out to the ultimate consumer.

It has long been, I think, a maxim in railroad construction that to start a
ilroad nowhere and end it nowhere and have it go no place will not make
ry much of a success. The biggest thing to do in railroad development is to
velop the terminals. As an instance of that you can see what is being done
Chicago and New York—miles of terminals—and in the expenditure by the
ited States of vast millions of dollars for development purposes, the ultimate
ccess should be looked into very carefully as to what the development of the
rminals is going to be. In developing terminals Cleveland is asking assistance
order to correct past errors, errors of our forefathers, who had no idea
hat the Lake commerce was going to be. Therefore this request comes from
e city of Cleveland largely to correct the mistakes of the past, and the city
icials, the people generally, and the various committees here who are inter-
ted in this subject, are in thorough accord with the idea that no new develop-
nt of the river will be allowed by either the local authorities or the United
ates Government authorities unless that development takes lines that are
tisfactory to the engineering department; that is, the river must be suffi-
ntly straight, and shall be well docked or laid out in a manner that is thor-
ghly first-class to work in with her problem.

Now, in this case we have about 4 miles of river to reach—I am interested
the Cleveland Furnace Co., and I will speak from that standpoint—4 miles
river from the lake front to the docks of that company. About two miles
d a quarter is the distance in a straight line, and of that 4 miles, or 4½
les maybe, it is a tortuous course and as difficult of navigation as can pos-

sibly be conceived. It is very difficult to get small boats for service for th amount of tonnage that is required. In the shipment of iron ore in larg quantities from the upper lakes it is necessary to "spot" a boat, and th boat must be there within a day or two of that time; and as it is harder an harder to get the small boats, it becomes harder and harder to get them ther This means demurrage charges or a refusal to take ore into the docks unles it is known when it is going to be removed, because these docks represen millions of dollars worth of property and they must be used to their best a vantage in moving large quantities of ore. The measure of the movement of o is the measure of dock capacity for handling it. Our difficulty is, as will seen, in securing a sufficient number of small boats, and this trouble is growin worse all the time, as the small boats are gradually going out of fashion. N new ones to amount to anything of the small type are being built, and in add tion to that many of the smaller boats are being converted into packag freighters, so it is quite the sensible thing, it seems to me, and the fair thin for the Government, to take into consideration the correcting of past mistak and controlling future development from an engineering standpoint.

Now, in speaking on the subject of what this means to the General Go ernment and to all the people as compared with its local interests, I just wan to emphasize a little bit our mayor's statement in the matter of the basin point in the making of prices on iron and steel. The basing point has bee heretofore practically all the time a certain price, which is fixed in Pittsburg That does not mean based on the cost at Pittsburgh, but the general lists a all published at a certain price, Pittsburgh, or made with the freight ra added from Pittsburgh. Now, if you are buying steel in Chicago, instead paying the price that the Chicago mill would ordinarily make if competitio was strong, what you pay is the price that the Chicago mill would make—b they call it Pittsburgh—and add $3.60 for the freight rate from Pittsburgh Chicago. When we buy steel in Cleveland—steel pipe, wire nails, rods, bar all sorts of steel commodities—we pay the price at Pittsburgh with the freig rate of $2 a ton added to Cleveland, and the nut maker who buys bars f making nuts and bolts pays the Pittsburgh base, cuts them up into nuts an bolts and screws, and ships them all over the country.

This is, we will say, a Pittsburgh nut maker, and the Cleveland maker h to pay the same price at Pittsburgh, with the Cleveland freight added, ev though he draws his steel from a Cleveland mill. In addition to that, it is well-known fact that the assembling cost is cheaper in Cleveland than it is Pittsburgh or in most any of the other districts in the North. The comparis goes even further than that, because if you go to Youngstown or Cincinnati Columbus you find that the base point is Pittsburgh with the freight rate add to the particular point, even if the shipment is made from Chicago. The effe that this development which we are now seeking would have on the larg cities of the West is this: It has been demonstrated many times that wh conditions come down into the very lowest price competition—in other wor when there is not enough business to go around, and the orders are very fe and the mills are very anxious for orders—they forget that base price for ders and make prices from the mills wherever located; but as soon as busine returns they will go back to the base price at Pittsburgh. The development a large production of iron and steel in its finished line—in its finished pa in Cleveland—will mean the destruction of that base-point idea entirely.

It will put it on a strictly competitive basis, with lower cost at Clevela and with the basing point from Cleveland—with the price at Cleveland at t basing point and the freight rate added to the point of consumption. Ev to-day the rates at Cleveland are such that a larger development will effect lower selling price in the Southwest and south of us, the dividing line will either Youngstown or Columbus down to the Ohio River, and farther south about that same direction, and on other side the meeting line between Chica and Cleveland will be somewhere in the neighborhood of Indianapolis. T rate to-day, at the Pittsburgh base price of $3.60 or more, added to the Chica rate, for delivery in St. Louis, would make Cleveland a cheaper point to liver to St. Louis, and the competition which will be developed will mean t elimination of that base-point plan and put steel pipe, wire nails, and all so of finished products that go to the retail hardware dealers on the basis of t selling price at the nearest point with the freight rate added, and that is t ultimate way of securing a delivery of the material to the consumer at t lowest cost. It seems to me that the whole duty of our Government a legislatures and political bodies is to see that the consumer has his mater

the lowest price at which it is obtainable, leaving a fair margin of profit to
e nearest producer.

This basing situation has come about by the old-fashioned idea that the rail-
ad would protect its transportation—make freight rates to protect the trans-
rtation. In other words, years ago they used to make the freight rate on
e sufficiently low and increase the freight rate on coke to Cleveland, so that
offset the natural advantages, geographically, which one locality had over
other. But the Interstate Commerce Commission at this time has clearly
veloped the policy that the railroads will not make rates of freight to favor
mmunities in order to increase the amount of interchange of traffic, but that
e rates shall be made proportionate to the service, as our mayor stated awhile
o, and if that is the case, the territory of lower Lake Erie will be the lowest
oducing point for iron and steel products and will fix the basing price at the
int of lowest cost of production, and, with the freight rate added, will be the
ice the consumer will pay. This seems, to my mind, to be a strong argument
favor of the Government taking an interest in this proposition—I know of
stronger argument than the mere fact that it will bring about in all
obability a very large development of production at the lowest cost.

Col. Black. May I ask a question? You have shown, as well as the mayor,
t this matter of the improvement of the Cleveland Harbor is not purely a
al matter; that there are other interests that would be benefited; and you
ve named other parts of the State of Ohio, and then gone from that to parts
the United States. Now, in our form of government we have, first, the
nicipal government, and over and above that the State government, and over
d above that the National Government, and in your arguments you have
wn that all three governments are interested; that is, first, the local com-
nity in Cleveland; second, the community which forms the State; and
rd, the whole community of the United States, and yet in your plea for
l, I haven't heard a single word about the State. Will you kindly tell me
ere that comes in?

Mr. Croxton. I don't believe I would be prepared to tell you where that comes
because I haven't been especially interested in this situation, except as a
mber of the chamber of commerce committee, but I think that the develop-
nt of a larger production at this point, and the development at the lowest
t of production will ultimately bring about a considerable lowering of the
ce to the consumer, not only throughout Ohio, but throughout Indiana,
nois, and all down through the Southwest, and will have its reflex action
st and West and Northwest, because of the fact that those communities are
v sending their steel into this territory, and when this territory will produce
aper than they, they will have to sell it in their own territory at a lower
re.

fact that I haven't brought out before is that almost all of the finished
el is made east of Cleveland, except a little community in Chicago, and the
ional Tool Co., at Lorain—the Pennsylvania Steel Co., the Maryland Steel
, Carnegie, Youngstown, Buffalo, Newport News, Bethlehem, Lukens Iron
, Worth Bros. at Philadelphia. The whole commencement of the steel in-
try was in the Schuylkill and Lehigh Valleys. It has moved westward until
eached Pittsburgh and Youngstown, where the greatest development occurred
account of the low cost of coal and coke. Now, the big jump comes over to
cago, but Chicago only sells its iron and steel as it is compelled to sell it in
petition which comes from Pittsburgh and beyond and that is the reason
the Pittsburgh base is made, because they don't have to go lower, because
e is nothing between of sufficient tonnage that will lower the price.

nswering your question, or not answering it, which I can not do, why the
te has not been asked to take hold of this matter, my own thought would
hat as the United States Government has done so much in all other rivers—
lmost every other river and inland harbor, it seems fair that they should
sked to take hold of this.

ol. Black. You know in Massachusetts, for example, the State is actually
g that. The State and General Government and community and all take
in the development system, and it seems quite the proper thing to do,
one having its own function and each one acting in proportion as the benefit
accrue, and I was curious to know why the State of Ohio, with its large
antage from this—and, understand me, I am not speaking as against this
rovement, because I think it would be of great benefit and ought to be done
out any doubt, but I don't see why the State of Ohio, which would largely

benefit from it more than the people of all the United States, should not something, too.

Mr. Croxton. All I can say is that the suggestion comes to me as a suggest to which I have given no thought. That is about all I can say as to that.

Mr. Springborn. Perhaps I may say, in that connection, the river and harb commission, city officials, and city-council committee, in studying this proble have given some thought to the question of State aid, not so much because the lower price of steel products that could be purchased at Cleveland, but m particularly because of the elimination of the flood danger. Lake Erie, course, in this section of the State is the outlet of all the waters that co down through the valleys leading into the Cuyahoga River. Last spring flood caused serious damage to all of our industries on the river. It might ha caused a great deal more damage. We were exceedingly fortunate in not h ing the large lumber piles and the large number of scows and barges t were harbored in the river here form blockades. If that lumber and ot material had become wedged in between the bridges, blockades would have sulted and millions of dollars of damage would have resulted that we did suffer from because we were fortunate, and not because the river was adequ to take care of the water. When I tell you that in the upper valley at Willow the place that you passed this morning—the city has a disposing work for disposal of its garbage—that plant is built upon a little hill, and yet we 12 feet of water in the boiler room, so that for more than a week the pl was shut down and the people of this city subjected to the inconvenience not having their garbage removed from their homes, because there was place to dispose of it. Up in that section, with 12 feet of water, the fl situation is one that is serious to us.

Now, just what authority the State has in assisting in matters of this k we are not prepared to say. I wish to say, however, that the State is giv the question of straightening and improving these waterways very seri thought. They have had, or have employed, men who are making surveys know just what it is best to do. The governor, in a statement made here recently, said that if the city of Dayton, for instance, should spend a la sum of money improving the waterways through Dayton and straightening river, that very serious results would follow downstream, because the wa that is now retarded would then be sent through at a rate that the terri beyond could not take care of, and more serious results would follow than last spring. However, in view of the Cuyahoga River being an outlet, improvement that the city and Government can make here will, of course, the territory farther to the south. I think, on that position alone, we would justified in asking the State government to assist in this work. The only that would have authority in matters of that kind, however, is the S legislature, and the legislature is not in session, so that no special request be made at this time. I have not the slightest doubt but what the city take up with the State the question of some assistance in the upper river think, however, this lower improvement—cutoff No. 1, so-called—is prima a problem that the city and Federal Government should solve, as that is r in keeping with the development of the outer harbor. Our thought has in this straightening problem, particularly in the lower part of the city it would be an access from the Government's harbor into the valley that w make a very adequate harbor here and at the same time make a short cut the vessels that have to reach the inner harbor.

Col. Black. You know what the Government and the State of New are doing in the New York Harbor, do you not?

In New York the State furnishes the right of way and the Government o the channel. I would recommend to your commission, however, as a ma that is well worthy of study for submission to your own State government. action of Massachusetts and what it is doing in making and preparing terminals for the utilization to traffic the channels given by the General ernment.

Col. Abbot. The appropriation last year by the State of Massachuset $9,000,000 for the development of the Harbor of Boston. Each year the of Massachusetts makes an appropriation varying from $300,000 upward the development of the smaller harbors of the State, which does not have much influence on general commerce, but it does have some. It has a value to the State, but no influence in general to the whole United States, so with the State and Government appropriations for the larger harbors, the State's improvements on the smaller rivers. The whole subject in the

Massachusetts receives a very well balanced supply of funds to produce the sical results necessary in their various waterways.

ol. Black. I would say the State of New York, in these rivers, is providing terminals; the State of New York is providing the right of way and the ited States is providing the channel. That is the way in three or four es in New York, where the work is now being done. In Lake Champlain, example, however, the State of New York has gone further. At Baldwins- e it is building another new terminal wharf by actually excavating the chan- I am only giving you examples of State action. If the United States had imited money, it might be a different matter from what it is.

r. Springborn. I perhaps ought to have said to you, in connection with what State is doing, that the last State legislature appointed a committee con- ing of members of the senate or house to study the State waterways—the als in particular—to know what action the State ought to take with reference hese canals. That committee has made a trip of inspection, and has had lic hearings in several cities through which the canals pass. Just what State will do, of course, no one knows until the committee's report is pre- ed to the legislature and some action is taken. It has, however, in that nection, made a study of the waterways, and I think the State is preparing ake some definite action regarding the canal system. In addition to that governor expressed a belief that the legislature should create certain dis- s in each of the villages or townships through which these waterways , and these, with particular reference to the flood situation, ought to have right to raise sufficient money to work out this flood problem, not from the l viewpoint but from a general one, so that the mouth of the river, or the am, or whatever it might be, will be taken care of at the same time the r ways are, so that the State is giving and will give to that problem, I k, sufficient thought to be in a position to say whether it can help.

ol. Black. Am I right or wrong in thinking that the State has added to burden very materially by giving the right of eminent domain and the t of condemnation to the railroads which have taken a large portion of territory to be used for tracks and terminals, to be used for your benefit, e sure, but without your consent, and which now adds nevertheless to the of carrying out this improvement?

r. Springborn. I think that is very true. Look at our local situation. If hadn't their freight houses and freight yards and car-storage yards, etc., ted in this valley, the problem of straightening this river would not take long to work out.

r. Clarke. Wouldn't have any city.

r. Springborn. No; we wouldn't, perhaps. That is true, and yet it does add e burden, and these are some of the points that our committee and city als have given some thoughts to; but I would not undertake to answer your tion. I have no authority to answer it, but I am stating to you merely an ne of what is in progress.

l. Black. You can see that in dealing with this problem these questions up to us at once. I do not know to what extent Government aid is neces- to enable this to go through, but I do know that the amount of Government must necessarily be very limited.

r. Springborn. I hope the members of the board will keep this thought in l, that the residents of Ohio and residents of Cleveland are also a part of Federal Government.

l. Black. Oh, yes; surely. There is no question about that.

. Springborn. You ask the question as to how far the city can go without ral aid. I am quite sure that I am right in saying the city can not carry project through alone. It is too large an undertaking. The mayor outlined u the difficulty; that is, the cities of the Middle West, growing as rapidly as re, in keeping apace with the essential affairs which cities must provide der that we may have a comfortable and decent city to live in. We have any things in Cleveland to do that we are constantly concerned with the em of how can we pay, so for that reason alone I think I am safe in saying the city can not carry this project through without the aid of the Federal rnment, and I hope you will keep in mind that we are a part of the Federal rnment.

l. Black. We all know the important part Cleveland takes in the ship erce of the United States.

. Springborn. We wish you to keep in mind that we are not asking what ink is unreasonable. Cleveland wants to pay her just share of this improvement or any other improvement. Were we in a condition financially to do it wouldn't ask Federal aid.

Col. Black. I am only suggesting another instrument which also has so interest.

Mr. Springborn. Very true; and we will have no hesitancy in asking State. One of the problems that we have thought your board would be int ested in is the physical development here, or the physical things encountered developing, so I have asked Mr. Hoffman, or the committee that made arrangements for this meeting have asked Mr. Hoffman, to talk to you ab the physical difficulties that might be encountered in making this improveme

Mr. Croxton. In case of the improvements made by the States of Massac setts and New York, are they improvements made to existing channels?

Col. Black. No; not altogether. The improvements I had in mind are qu similar to this Cuyahoga, where a very winding stream is being straightened

Mr. Croxton. It seemed to me it possibly might differentiate some in y mind in the production of a new channel—a new harbor—as against the c rection of mistakes of our forefathers in existing and daily used channels, a especially in the case where, I understand, it is the policy of the local auth ties and people to make all of the additional improvements. You see my poi We are differentiating between asking you to produce a new channel and c rect existing mistakes which our forefathers made.

Mr. Hoffman. The improvement of Cuyahoga River by widening, deep ing, and straightening has been a project which has received attention fr various sources for many years. This river furnishes the basis from wh such navigation and harbor interests as the city of Cleveland possesses developed and no doubt formed the principal reason for the building of a in this locality.

The desirability and necessity of improving and developing a stream, urally crooked, shallow, and changeable, has been recognized since the city established, the amount of work and expense expended upon such project pending upon varying conditions and financial considerations.

In the early periods of Cleveland's existence there was need only for a sh stretch of deepened channel, extending from the outlet of the Ohio Canal the mouth of the river. During this period the limited areas of land situa between the river's banks and the city streets paralleling the same was s cient in size to afford dockage for the small vessels built to accommodate comparative meager amount of passenger and freight traffic loading and loading at this port. In later years, as large manufacturing and other c mercial developments increased with the city's growth, there grew a dem for more dockage, great areas of land, and railroad connections. With s demand arose the necessity of enlarging the river and the building of do farther upstream.

The use of the docks for shipping purposes along the lower portion of river has been greatly lessened in recent years until at present such por of the river has become practically a waterway leading to a great inner har and water freight terminal, located principally upstream from Central Viad

Unfortunately the portion of the river between Superior and Central ducts is so crooked and narrow that it presents a great obstacle to the pass of even moderate-sized vessels from and to the terminal district above (tral Viaduct. Vessels of greater length than 480 feet can not be taken thro this section of the river, and as this size of vessel seems to be the type most in demand, and is one which will soon be carrying by far the bulk of freight being shipped to and from this port, there now arises the necessity enlarging this section of the river, or of providing a new channel in its place

Consideration of plans for the bettering of this condition has been given the engineers of the Federal Government, by the Cleveland River and Ha Commission, originally appointed for such purpose, and by the city's engin ing department. The study given the situation by the Federal engineers, by the Cleveland River and Harbor Commission was specially exhaust coupled as it was with inspections, calculations, public hearings, and invest tions relating both to its engineering and commercial aspects. The resul such study is that three plans of betterment were proposed, the first know route No. 1, which contemplates the cutting of an approximately new di channel from a point just upstream from the Baltimore & Ohio Railroad bri near Superior Viaduct, to a point in the existing channel a short distance be the Cincinnati Slip.

The second plan, known as route No. 2, contemplates widening the existing
nnel to Columbus Road, and from there cutting through the hill alongside the
ie Railway tracks, thereby extending a new channel to a point in the existing
e just below the Central Viaduct.

The third plan, known as route No. 3, contemplates widening the existing
nnel alone.

These various plans have each their champions, as each possesses some merit.
e following facts relating to these plans should be given consideration:

Route No. 1 shortens the river length the most, reducing such length by 6,500
t; it presents less engineering difficulties in its construction than route No. 2;
eaves a greater portion of the present channel available for slips and dockage
n either of the other routes; its estimated cost is least. It presents complica-
ns in connection with the construction of the new Superior Viaduct, now
ler way, resulting in a reduced vertical clearance, possibly a minimum of
feet (93 feet being the maximum and approved clearance for bridges along
s section of the river).

Route No. 2 shortens the river length by 5,715 feet; it presents engineering
iculties of considerable moment in the arrangement of railway tracks in
vicinity of the Columbus Road cut; it continues using the river as a through
nnel alongside the coal-loading plants of the Erie Railway; it locates the
nnel alongside a hill cut of considerable dimensions; it requires a multi-
ity of bridges; it is estimated to be more expensive than route No. 1; it
rds otherwise a good alignment and presents no complications in connection
h Superior Viaduct; it also leaves certain portions of the present channel
ilable as slips.

oute No. 3 results in no shortening of the river length; it is estimated to
more than either route No. 1 or route No. 2; provides no extra slips, and
sents no complications at Superior Viaduct.

he consensus of opinion seems to be that as a river improvement route No. 1
ld be the most useful and most feasible to construct. Special reference
nade to the printed report of the Cleveland River and Harbor Commission,
page 17, wherein route No. 1 is recommended, also the favorable attitude
ard improving by means of route No. 1, shown in the printed report of the
ial committee of the council appointed to investigate and report on the
rovement of the lower Cuyahoga River, pages 21 and 24.

ew if any serious engineering difficulties present themselves in connection
the opening of the proposed channel of route No. 1. The lands through
h this channel is planned are approximately level, consisting of a mixture
and and clay, which can be easily dredged. The proposed bridges which
ld carry existing or rearranged streets, or the railway tracks, across the new
nel, can all be made of practical dimensions and spans. The proposed
nel, while not straight, is made up of easy curves, presenting no obstacles
avigation. In common with all suggested routes, this one will require the
val of the swing span and center pier of the present Superior Avenue
luct, together with the widening of the existing river channel at this loca-
Probably the westerly or rest pier of the Baltimore & Ohio Railroad
ge will also require moving to a more westerly location, such relocation
ng been anticipated when permission for the construction of this bridge
given. That is my recollection of it, anyway, and I think my recollection
rrect.

ould this cut be made as heretofore noted, the length of the river would
hortened by 6,500 feet, or there would be a saving of nearly 2½ miles in
round trip of every vessel using such route in its trip to the upper river,
ing possible a very substantial saving in time and expense, as the round
even to the present city limits, would be shortened by 18 per cent and
spondingly more to all points downstream.

rtical clearances for fixed bridges over Cuyahoga River for one span of
ew Superior Avenue Viaduct, for Central Viaduct, and for the Clark Ave-
Viaduct now building, have been approved at 93 feet above the city base
vels, making a clearance of a little more than 95 feet above the normal
of the river surface.

ould a new river channel be cut through in accordance with route No. 1,
ould require a change in the plan for the new Superior Avenue Viaduct,
its design no provision was made for spanning the proposed channel.
provision could be made by substituting for certain of the planned con-
arches a steel arch of sufficient span to have an ample waterway. The
cal clearance, however, would be less than 93 feet, as the floor system of

such a proposed arch would only permit a minimum of something over 80 f This reduced clearance might affect vessels without load undertaking to p under the bridge. Vessels, therefore, which it would be intended to pass loaded would be required to have their masts adjusted accordingly, incre their draft by means of water ballast, or else have recourse to the old channel way of the Columbus Road bend, thereby making use of the existing chan under the proposed new Superior Avenue Viaduct, at which location the pl provide for the normal 93-foot vertical clearance. It has been maintained many that the large amount of traffic which ultimately must find its way the upper-river district will without doubt be reason enough for making slight change in vessel operation or construction which may be necessary make use of this reduced vertical clearance.

It has also been claimed that some vessel owners would not care to ad clearances to fit the suggested reductions and therefore the proposed chan as proposed in route No. 1, would not be used to the extent that it should.

If this latter claim has weight enough to make it a determining element, alternatives are possible; one to change the design and extent of the bri so that the 93-foot clearance could be obtained over both the present and proposed channel, and the second to change or abandon route No. 1 as the vored manner of making the river improvement.

Should a change of route No. 1 be brought about it would be by the us route No. 2 or route No. 3, or possibly by the adoption of a later sugges to modify the northerly end of route No. 1, so as to intersect the existing r channel upstream from the proposed location of the new Superior Viad This modification would require a sharp turn to the east in a winding basi be provided for such purpose.

Such a new channel as route No. 1 proposed must be of great value for r in case of floods. At present the portion of the river located between the ends of the proposed new channel contains the greatest obstacles to the flow of the flood waters, due to the extreme crookedness of the river, its row width, and the contracted channel at the various bridges. The prop shortening of 6,500 feet in the channel length will result in a much be hydraulic grade, and the greater width of the new channel, free from ser encroachments of bridges, will yield a greater cross section of waterway. T changes will surely safeguard this section of the city from danger of b submerged at times of floods, which is of benefit not only to the city but to large railroad traffic which uses the tracks located alongside the river char carrying freight and passengers to many distant points.

While no detail plans have been made, it has been possible in a general to estimate the cost of the improvement. The cubic yards of excavation, linear feet of docks, the number of bridges, and the area of land needed ar items which it is possible to approximate, while the expense of railway cha and consequential damages must necessarily be less well established. In item, however, liberal allowances were made for cost in excess of the p arrived at for purposes of the estimate, and it is thought the estimated co liberal and sufficient.

Mr. SPRINGBORN. I think you gentlemen ought to hear from some people are interested in the upper-river development. The property owners up t agree, if the river is straightened to give the city the land to make the imp ments, building their own docks and making improvements themselves, so any money the city now expends in this lower-river improvement is not in sense involved in this upper-river improvement. I have asked Mr. Joh Clarke to speak in behalf of those who are interested in the upper-river va

Col. BLACK. How far up do you call the upper—what portion of the riv

Mr. SPRINGBORN. Beyond the Cleveland Furnace Co.

Col. BLACK. As far as we went this morning?

Mr. SPRINGBORN. Not as far. It is a little south of the Harvard-Den Bridge.

Hon. JOHN H. CLARKE. Mr. Chairman and gentlemen of the commis while, as Mr. Springborn has said, I am here in the capacity of counsel fo owners of the land lying to the south of the present head of navigation, would like you, gentlemen, to credit me with what I am going to say to you believe that I should not be here and would not say one word if I wer convinced, as a citizen of the Nation and of the State and of the city, tha action which I am going to urge upon you would make for the public welfa

I do not believe there is a man in the country who is more opposed t use of national revenue for private or local purposes than I am. My ave o special privilege of every character is so bred in the bone that I can not speak on such subjects as this we have here in hand except I am convinced that he purpose is one entirely general and public.

Now, I represent, and have for many years represented, as counsel, the owners of substantially all of the land in the valley from the head of navigation to the Dennison-Harvard Bridge. Last January the Otis Steel Co. purchased 200 acres, upon which they are developing the plant which you saw in the process of erection this morning, and which contemplates an expenditure of about $10,000,000. The remainder of the land between these two points is owned by my clients.

The Otis Steel Co. and the Cuyahoga Valley Land Co. have united their efforts o develop this upper river valley. The land company has donated all of the and necessary to straighten the channel from just beyond the present head of avigation to the Dennison-Harvard Bridge, and the two companies jointly ave contracted for the excavation of that channel upon terms which will involve an expenditure in excess of a quarter of a million dollars. This is to be without one dollar of cost to the city. It straightens and excavates the channel rom the point where the railroad crosses the river to the Dennison-Harvard Bridge, a distance of about a mile and one-half, thus giving 3 miles of new dock rontage.

Now, our interest in the improvement which is under discussion here to-day es in this: That it will not be practicable to use this land of ours for commerce carried in large vessels unless the lower channel is straightened, and in ddition it is absolutely necessary that the channel below us be straightened o the end that flood disasters may be avoided. Thus you see we are not here, at in hand, asking favors, but we are coming to the city and to the Government aying: "Here is a straightened channel, provided and excavated at great xpense," and we ask simply that the city and National Government shall join ands with us in making it available for that general commerce which ought to e carried upon it.

As you saw this morning, this land of ours and much more will be available or all kinds of manufacturing which requires large acreage for its plants, and his means, of course, that it will be devoted largely to iron and steel manu-acturing plants. The ore for such plants must come from Minnesota; the oke must come from Pennsylvania and West Virginia; the limestone will come rom the islands of Lake Erie. The men who mine the iron ore and mine the oal and make the coke are just as much benefited; are just as certainly given nployment by such enterprises as the mills here in Cleveland. The local citizens, other than employees and their immediate dependents, will derive no more enefit from this development than the men who are scattered abroad over the ation. In addition to this the result of this development will be, as has been utlined here to-day, a means of lowering the price of iron and steel, and as a esult these products, at a lower price, will go all over the country. And so it ecomes apparent that this improvement will work a national benefit, and such esult is all the more important just now, because, as the mayor has indicated, rom now on we are going to try for the first time as a Nation, to stand on our wn commercial merits. The manufacturers of this country are at least going o make an effort to stand alone, and we must take advantage of every natural dvantage which we have in this new race for international trade.

The chairman has asked why does not the State of Ohio contribute to this ver straightening. The answer that occurs to me as a lawyer is that the ty of Cleveland is a distinct department of the State of Ohio—an agency by hich a part of the State government is carried forward—and therefore when he city contributes the State of Ohio is contributing, and by long practice and he settled habits of the people of this State this is considered as Ohio's con-ibution. Ohio has never contributed to the development of internal improvements except to canals, and, in a very limited way, to roads. These canals ere developed long before the day of the railroads, or they never would have een built at all. They have been a burden upon the State. The survey which now being made of them is to consider whether they should be abandoned great sums expended upon them to deepen and widen them and make them vailable for larger commerce. The probability is, I think, that some of the anals will be widened, some abandoned. Probably the one which has its orthern end in the Cuyahoga River will be extended or enlarged to a point here it meets the Muskingum River, but no man can speak definitely as to is. I suppose New York is an exception to the rule as to the practice of the various States, but whether it is or not, it is very certain that in Ohio we ha such a settled practice and habit of the people that aid for such an enterpri can not reasonably be expected. Right or wrong, this is the condition whic confronts us.

Col. Black. May I say something right here?

Mr. Clarke. I would be very glad to have you.

Col. Black. In regard to the policy that you say has been followed by t State of Ohio, that is one that has been generally followed by almost all of t States. Within the last 10 years, however, the people of the States, und the pressure of the cities, have been finding that that policy will not do. T day New Jersey, that is probably the most conservative State in that respe in the Union, is being agitated to have State controlling supervision of i water-front terminal facilities. There is a strong movement growing up ther

Mr. Clarke. What points have they in mind?

Col. Black. Just at present, Newark and Jersey City and those points arou the sea. New Jersey has started in, however, on water development quite e tensively itself, on making an intercoastal canal along the eastern boundar and offers to donate free of charge to the United States the right of wa That has been done by the New Jersey Legislature for the Intercoastal Can across the State of New Jersey. Now, however, the people of New Jersey a agitating for something further—for a commission to absolutely take charge the development of the water freight facilities of New Jersey. So much f that. Mobile, in Alabama, is also taking a prominent part—a State board f the development of the terminals—and I understand a number of oth Southern States are doing the same thing. Florida has, to a measure. Pen sylvania is practically doing it. In other words, the policy, the well-settl policy and habits of the people is being broken down under the pressure the cities.

Mr. Clarke. I am glad to know that, but do you have in mind the percenta of the total cost which is being paid by the city and the State in such case

Col. Black. No; there is nothing fixed as to that as yet.

Mr. Clarke. That might be very important, for here the city offers to p 50 per cent, by action of its council. Of course the same result would reached if the city should offer 25 per cent and the State 25 per cent.

Col. Black. Years ago, in Florida—way back in 1888 or 1889—the county St. Johns, finding it could not get the Government to give sufficient funds the development of the St. Johns River property, bonded it itself and carri on the improvement without any United States aid at all. I might say on th subject that the faith of St. Johns County in that respect has been absolut justified. An increase in commerce was the result of this action. The co merce of Jacksonville has increased, I think, twentyfold since 1888, or mo However, that is another matter. I only want to say that this policy is n being changed, and the people at large in the various States are waking up the necessity for these things—the economic necessity of getting all out of t waterways that they should get—and are doing these things which they not think of years ago.

Mr. Clarke. I am glad to know that; but it seems to me before we c apply it to any other situation than the one it has been applied to, we m ask the question whether the conditions where it has thus been resorted to the same as in the other places to which we think of applying it. For instan we all know that Massachusetts is very largely tributary to Boston; it is only considerable port they have in the State—the only one we ever hear down here at all events—and it is the hub about which the whole State and commerce largely revolves. So it may be that the development just sugges in New Jersey might so affect all of the people of that State, narrow at it that aid could be obtained from the people of the State at large. But let look to the situation here at Cleveland. Get out of the immediate local area Cleveland—I mean the immediate area that would be directly affected by growth of Cleveland by increase in land value—and how much more would other citizens of Ohio be benefited by this kind of an improvement than citizens of New Jersey would be?

Col. Black. I have heard Youngstown mentioned in your addresses a gr many times.

Mr. Clarke. Let us take that city, 65 miles away—one of the greatest riv we have—a great steel center. Youngstown would not be advanced by t improvement; on the contrary, it might be very much injured, I take it. we developed the steel and iron industry which is suggested here it would res lowering prices, which Youngstown would have to meet, interior town that is, and dependent wholly upon railroad transportation. This would start pposition in various parts of the State.

But is it sound thinking to say that State lines measure the benefits which ould be derived from such an improvement as this? If we could make cheaper eel and send it to Chicago to purchasers there it would be of as much adntage to them and to their customers as to the people of Ohio.

Col. Black. There are a great many benefits come from these things. One the direct benefit from increased taxation, and these are reaped entirely by r system of government, by the locality and by the State. The indirect adntages are scattered.

Mr. Clarke. I beg your pardon. I would agree if you would say these adntages are reaped by the city and the immediate locality. I doubt very much they are appreciably obtained or enjoyed by those beyond, and I am afraid u would have to labor hard to convince the people of Ohio of it.

Col. Abbot. In answer to Mr. Clarke's question about Massachusetts, I should y that in the case of Plymouth Harbor the State made an appropriation last inter of $63,000 for general dredging of wharf facilities, to meet an approiation of $63,000 by the United States on condition that the State make the ppropriation. They offered for Salem Harbor an appropriation of $50,000 to eet an appropriation by the United States of about twice the amount, so the ppropriation in amounts varies from one-half to one-third, so far as they have en actually offered through the legislature.

Mr. Clarke. The city of Cleveland comes open-handed and offers 50 per cent ithout aid from the State, so we are doing as well as Massachusetts and her ties combined.

Col. Abbot. In the Boston Harbor appropriations the State has exceeded the ppropriations of the United States by about 50 per cent in the last 20 years.

Mr. Clarke. In Boston?

Col. Abbot. Yes, sir.

Col. Black. The State of New York is spending far more on its waterway rminals than the United States has ever spent there. There is no comparison, wever. I am only saying what the States are doing.

Mr. Clarke. It is well even to know this; nevertheless I can not help but think an interior State, such as ours is, and in an improvement located as this one the thinking is not sound as applied to the remaining territory of the State— mean the territory beyond that which is in the immediate locality, and Clevend is willing to pay on the basis of the whole of the local advantage which e is likely to reap from the enterprise.

Col. Black. There are other details we could go into in connection with ited States payments, but I don't care to. One of these is that the United ates pays for nothing it does not own, and anything it would pay for in the y of Cleveland it would have to own, which might be very detrimental to eveland and to Ohio.

Mr. Clarke. I think that could be adjusted.

Col. Black. Might or might not; I do not know.

Mr. Clarke. But the real point is, is it not: Shall an appropriation be made r the inner harbor?

Col. Black. And which case stands on its own merits.

Mr. Clarke. Heretofore there has been no appropriation for the inner harbor Cleveland by the Government, but as I understand it the line of demarcation s been the Pennsylvania and Lake Shore bridge, near the mouth of the river. yond that all improvements have been made by the city. The real question are discussing then is whether the Government shall contribute much or tle toward improving this waterway as far as the Erie Railroad bridge. That the real question, and, of course, there is no reason why the one should not the line of demarcation rather than the other, if there is no objection to the velopment of the inner harbor. Now my suggestion is this. The Government s made large expenditures on our outer harbor. It is palpably apparent m what has been said here to-day that the usefulness of these expenditures retofore made on the outer harbor can not be increased, indeed the usefulness them will shrink unless this improvement be made. Work in the outer harr is done, I am informed, in such a manner that nothing will be needed there r many years to come, so that the question is: Should the Government now d assistance to that development of the inner harbor which is necessary to e largest usefulness of the improvements already made and to the developnt of a commerce nation wide?

Col. BLACK. I think the outer harbor difficulty is one that is met with fr
quently in many of our larger cities, of a tangle in legal questions about riparia
ownership. The development of your outer harbor to-day is held until the
questions can be settled in the courts, one way or the other.

Mr. CLARKE. That is true in a measure, no doubt, and such controversies oft
continue for an indefinite period; but, Mr. Chairman, if there were no obstacl
of this kind at all and no legal troubles at all, the fact would remain that t
development of this great city up to that lake-shore bluff has made the val
of the land so great that no industry which requires a large area for its pla
could afford to buy the quantity of land which would be necessary and th
undertake to compete with other manufactories. The price would be absolute
prohibitive. I am sure I am within the mark in saying that for this reason t
lake front is not now available for such manufacturing uses. Everybody,
am sure, every citizen in this town will agree with me that a development of t
character which this upper river can give us is not feasible upon our lake fro
and the reason we are asking for Government assistance is that we are su
it is a development that will affect the people of the whole country. It affe
the foundation industry of the country, the one upon which all of the othe
must build, the iron and steel business, which is the barometer of all the oth
business of the country, because its products enter into every other indust
If we can reduce the price of iron and steel and make of this valley anoth
Mahoning, another Monongahela Valley, we surely will have contributed great
to the commerce of this Nation; and it is because I believe the Federal Gover
ment ought to assist in such an improvement, destined to bring such large a
vantages to all of the people, that I am here urging it upon you.

Col. BLACK. We are very glad to have heard you.

Mr. SPRINGBORN. Perhaps Mr. Rice, who is a member of the river and harb
commission, would like to say a few words.

Mr. RICE. I will have to ask you to excuse me. I did not come here p
pared to speak, and the arguments I have heard here are so able it is har
necessary for me to speak.

Mr. SPRINGBORN. I would like to have a general discussion of it among th
who are here, if there is time for it, and there is still some information.

Col. BLACK. I think we would all like to go on; it is now a few minutes o
and we shall adjourn at 5. I would like to hear if there are any people he
who have anything to say on the other side.

Mr. SPRINGBORN. Possibly there may be some here who are not in full acco
with our program or who have other views.

Col. BLACK. You are more familiar with your citizens than I am. Kind
call on any of them.

Mr. SPRINGBORN. I don't know as I could call on any one in particular rep
senting the other side of this question, and yet I would like to hear from any
them at this time.

Mr. MURPHY. Mr. Chairman and gentlemen, I am Irish. I feel that possib
a little insinuation has been made against that organization which I have t
honor to represent, the chamber of industry. I wish to say on behalf of th
organization that it is a body of men filled with honor and filled with reasona
pride in a civic way, and the chamber of industry as a whole is always rea
and willing to aid any project that leads to progress and prosperity to the c
of Cleveland. I very much regret on behalf of that body that our representat
in this matter of river and harbor commission, who is a very well-posted m
is not present here to state all he knows about the matter.

There is only one part of this discussion at all in which the chamber of
dustry will take any exception, and that is in route No. 1. That is the o
thing we are deeply interested in, for the simple reason that the main arte
between both sections of the city is concerned, and in their view, and in
view of the residents of the west side of this city, which number at least
quarter of a million—and when I say west side, I include also the south side
in their view that bridge is so important and so necessary that to make a
changes in it at this time or at any future time in order to meet that provis
of a maximum of 93 feet would be very objectionable to them.

Col BLACK. Which bridge?

Mr. MURPHY. What is called the Superior Viaduct. Now, as regards
river improvement. As regards what has been said by the gentlemen h
to-day, I want to say, while I have no authority to speak positively for
institution as a whole, yet I would feel safe in saying that they are heart
in accord with any improvement of this kind, provided it does not touch

nterfere with what is an absolute necessity for them—route No. 2. Route No. —whichever is chosen—whichever the Government will favor will certainly e agreed to by them. They feel that they are misunderstood in many instances. noticed in the paper this morning an article headed "Chamber of commerce vill ask aid of their foes." The chamber of industry is no foe of the chamber f commerce at all. They are working in cooperation with them at every stage f the game for the interests of the city of Cleveland. They are independent; hey allow the other fellow the right to his opinion; they demand the same ight as far as they are concerned, and I say to you the only possible objection f our body or the residents of our section of the city as regards anything that as been said here would be an objection to route No. 1.

Col. Black. Possibly Mr. Pickands could tell us something about the height equired for boats to pass under the Superior Viaduct with route No. 1.

Mr. Pickands. In that regard I would like to say that several years ago vhen there was a hearing before the United States Engineers with reference o making the so-called Central Avenue Viaduct, formerly a swing bridge, into fixed span, at that time it was agreed by the vessel owners, after a protracted earing, that the vessel owners felt that they could probably handle their hips with a minimum clearance under that bridge of 93 feet, and that to-day s the lowest on any of the harbors on the Great Lakes, and as far as the future hows there is no probability there will be a fixed span over any of the harbors f the Lakes with as low a clearance as that. The topography of the harbors f the Lakes that I know of in no other instance calls for a fixed span across he harbors. In most all of the other cities the land lies low, and the bridges, uch as they are, are of the lift type. When that bridge was made fixed a year go this past spring, at the opening of navigation, it was found very few of he boats on the Lakes could go underneath the bridge, and almost all of them vere obliged to lower their masts to give 93-foot clearance, and owners of ake boats agree that that is the minimum clearance which they ought to be sked to stand. The requirements of the Government as to carrying masthead ghts in a measure regulate that, and in the opinion of the shipowners and asters they are as low as they should be at the present time. Many of the essels even now carry them higher than the Government requirements.

I think Mr. Hoffman stated that in case route No. 1 were adopted and the hannel went under an 85-foot clearance vessels could pass under this lower learance only by several expedia, either by putting them down in the water, r by adjusting their masts to meet the clearance, or by taking the old channel.

One of the worst places we have in the Cleveland Harbor at the present time s what is called the Irishtown Bend, which is in that part of the river imediately above the new Superior Viaduct. I think it would be very difficult o get the largest boats at the present time around that bend. I think it probbly could be done, but with any greater growth beyond the present size of ur ships they wouldn't be able to go down the old channel; and whether it ould be possible to provide the boats with adjustable masts, or whether it ould be possible to put them under there by filling them with water and ading them down, I have some doubt. It might be possible, but whatever pecial requirements would be necessary to get the boats under that clearance, hich would be less than any other clearance on the Lakes, would be a hardhip, would be a handicap, and would be detrimental to all those interests loated above that bridge. Vessels have gone to the upper Lakes for years ith a draft of water of less than they need at other ports.

Almost every spring before dredging is completed cargoes that go to the upper akes have to be stopped and part removed in order to permit them to go up he channel, which at that time has insufficient draft. This bridge clearance ith less than the minimum provided at other places would present the same ind of a difficulty. It would be just that much limitation and just that much andicap to the commerce going to these upper points, and consequently to ese points themselves. I don't think it is any particular object to the essel men, as long as the rates remain the same to all ports of the Lake— is preference in any event is not to go to the upper river. It is a long haul nd takes a long time. He is at additional expense to go there, and his prefrence would be to keep away from there so long as he could find sufficient usiness for his boats at the other ports. He would, I think, prefer not to acmmodate himself to that condition which would, I think, work, or likely ork, to the extent that industries on the upper river would have to provide emselves for tonnage for carrying their products, either by barges or conacts, at a price sufficient to compensate the owner for the annoyance.

I am just as interested in the completion of the high-level bridge as anyon in the city can be. It is a matter of vital importance to the city of Clevelan and I have not suggested or advocated at any time any delay in the constructio of that bridge, but I have up to the present time believed that that bridg could have been designed and completed in such a way as to provide a 93-foo clearance over both channels at no additional cost and at no delay. I am no prepared to say at the present time but that it may not have gone so far tha some delay would be involved, but I still believe that the great future of th city of Cleveland would be better served by taking care of this enormous com merce, developing that enormous undeveloped territory between the presen upper head of navigation and the Dennison-Harvard Bridge, even if som slight delay has to be suffered in the completion of the bridge. I think tha could still be obviated, but at the present time it is doubtful.

Col. Newcomer. Do you consider that bridge would largely nullify the benef of the improvement if at the lower height?

Mr. Pickands. I would hardly want to go so far as to say that. I think i would be of a considerable disadvantage, and I would be very hopeful that som way could be found to complete plan No. 1, which I think is altogether th better plan, and at the same time give us the proper clearance; I would b very hopeful that that plan could be worked out to give us not only plan N 1, but also full clearance.

Col. Newcomer. I understood from Mr. Hoffman's statement that it wa not contemplated changing the bridge to a greater height. Is that so, M Hoffman?

Mr. Hoffman. I assumed it was not contemplated to change the bridge. Th change would be in the waterway. That would leave a clearance of somethin over 80 feet—something like 83 feet, which of course would interfere with ligh vessels.

Col. Newcomer. Mr. Pickands said that could be changed without much i creased expense so as to give you the necessary clearance.

Mr. Springborn. May I say a word on one or two other matters that hav come to my mind in your discussion? The city gave very serious consideratio to the question of changing the plan of the bridge. As stated by Mr. Murph and Mr. Pickands, it is important to have the bridge built at as early a dat as possible, and we do not desire to have this river improvement, even as im portant as it is, delay the construction of this bridge. We have gone forwar on the assumption that if a straight, wide, adequate channel to the river wa provided the man who builds the vessels and owns the vessels would soon s aside his pride in the additional 10 feet of the top of the mast, and he woul either cut it off or arrange to lower it when he came to this point. It has bee pointed out to me that in vessels carrying freight to that upper river ther would be sufficient inducement for the owners of vessels to arrange their mast so they could go through under this proposed bridge. We have not felt at an time that there would be the slightest disagreement between the Governme and local authorities in matters of this kind, but have felt, for the reaso already stated, that these matters would adjust themselves, and I hope the has been nothing said to-day nor any impression given that there is any co flict at all. I feel sure that the people who want freight to come into the upp river will get it, and those who have vessels to carry it will want to bring to them, and while it may at present seem to be a little handicap I think w will soon overcome that. Mr. Collins, who represents one of the steamship co panies, I think ought to be heard on that point, but before resuming the su ject I would suggest this:

We have with us one or two railroad men, and since reference has bee made to the obstructions in the valley it might not be out of place if we gave moment of our time to hearing whether the railroads are willing to coopera with the city and Government in making this improvement by the rearrang ment of their tracks. Now, as to the question raised about the outer harbo Mr. Clarke and Mr. Croxton have shown in their talks that it would not be th proper place for a large factory. I know this, from my official position, th land along the lake front is worth from thirty to fifty thousand dollars p acre, and a blast furnace or steel works built on land worth that much coul not compete with plants built on land worth $5,000 per acre; so I think th answers that question. The city has to-day secured reversionary rights an riparian rights along the water front, so that we may develop the harbor f package, freight, and passenger vessels and recreation places, which the La Erie water front seems so well adapted for. We now have two parks, o

ı the east and one on the west lake front. We propose to develop these water-
ont parks so that they will be of real use and benefit to the people of Cleve-
nd, and we hope the Government representatives will realize the importance
this inner harbor work; a real harbor for Cleveland; a real terminal for your
aterways in this valley.

Before I sit down I want to say in behalf of the city, we appreciate your
ming here and we appreciate the attention you have given this matter, and
e hope that the thought that is in your mind about the State assisting will not
fluence your judgment in giving due consideration to what the Federal Gov-
nment ought to do. I can say for the people of the city of Cleveland that
ey have without a murmur contributed to all of the improvements in water-
ıys that the Government has carried on and assisted in since Moses Cleaveland
st drove a stake in this territory. We have contributed our share to other
rbors and other river improvements, and now we are asking the Government
do a small part in assisting us. The people in the other parts of the United
ates have had what help we could give and we are sure they will not object
helping us. I want you to carry that thought with you, that we are a part of
e Federal Government; we have assisted in other harbor improvements, and
now ask that you assist us in this undertaking. You will recognize as en-
ıeers that it is work that can not be spread over a series of years. It must
done at one time. In other words, you can't spend $50,000 this year and
),000 next year, and make that improvement, so for that reason we are asking
deral Government help, because it means an outlay of several million dollars
one time, a thing Cleveland unassisted can not do.

If you gentlemen would care to hear from the point of vessels passing under
is bridge, I will call on Mr. Collins, and then I will suggest that we hear from
. Lechlider or Mr. Johnson, of the Baltimore & Ohio Railroad. I am not
re whether the Erie is represented here or not. If it is not represented I
ow I can say the Erie is willing to cooperate; Mr. Duncan, the general super-
endent, has so advised us, that they will do anything to rearrange their
cks. With these matters disposed of, I think we have said everything we
ght to say to you.

ɔol. BLACK. Something has been said here as regards the fixed plan of the
ited States in keeping in the outer harbors. You gentlemen in your discus-
n have put up some reasons why the United States dislikes inner harbors—
ause you have a conflict between land transportation and water transporta-
n, and it springs up always. Inner harbors, where they can be avoided, are
satisfactory. That conflict always comes. Until the time that the tunnel
tem gets perfected so that bridges are unnecessary it will always come up.
bridge is an infernal nuisance; a drawbridge interferes with land traffic;
lroads accept them because they must, but they are a source of danger, and
steamboat men accept them because they must also, and for no other reason.
w, in the Superior Viaduct you are asking to make a waterway or clearance
under the bridge that they say is too small, and there is another trouble
ııing——

Ir. SPRINGBORN. But we have the other clearance of 93 feet; we will have a
ıble one.

ɔol. BLACK. Which you say is inadequate.

Ir. SPRINGBORN. That is true for a light vessel. The vessel can go up in
new channel under an 83-foot clearance; if they prefer to cut their masts
they can come down light under either one. My thought about it is that
owners of vessels will not let the question of 8 or 10 feet on the top of the
st stand in the way of their going through on this new channel. They will
ıe because that is what they want; they want the river straightened, and
le we feel that is our own fight, yet we feel that the development of our
erways and railroads and development of our city all go hand in hand.
hout one the other would be of no use; we must all work together.

ol. ABBOT. The effect of a low bridge upon the value of properties in East
er, N. Y., is an illustration of what might happen here. The 135-foot span
he Brooklyn Bridge decreased the value of the water-front property on East
er above New York, I have heard it said, about 20 per cent.

Ir. SPRINGBORN. That is barely possible, but, of course, you have a different
lition. Vessels that came into this port 20 or 30 years ago had higher masts
ı those that come into it to-day, and if you will consider that you will realize
masts can be cut down, and that the bridge is not a serious obstruction to
improvement.

Col. **Black**. There is one point about that that has not been touched on here. I do not know to what extent wireless requirements are enforced on the lake vessels. On the ocean the wireless has caused an increase in the heights of the masts far beyond what was ever deemed necessary. Formerly on the ocean steamers these were merely pole masts for derrick purposes, but now the largest ocean steamers have the top of their masts 213 feet above the water, due to the requirements of the wireless.

Mr. **Springborn**. We have vessels now with wireless masts, but they don't come into the inner harbor except passenger boats, and they come in north of the Superior Viaduct, and we have made a lease with two of the larger passenger boat companies here for one of our piers on the water front, and that is why we propose the use of this outer harbor for that kind of traffic and keep the inner harbor for the manufacturing and industrial developments of Cleveland. So there will be no wireless apparatus which will need to go up into our upper valley; no passenger boats will go up there. I would like to hear from Mr. Collins on that matter.

Mr. **Collins**. I might say we have a great number of ships on the Lakes; some of them are trading to the upper river valley and many of them are not, for they are too large to go there. The question of safety is a question that is being emphasized in water-borne traffic all over the world now, and we do not feel that we are behind any of the desires of any of those who are connected with water-borne traffic to make it as safe as it possibly can be made. We do not carry passengers, but we do carry large crews in the aggregate, and we are very much interested in making transportation safe for them and safe for the investor. We do not feel, so far as the consideration of the local project is concerned, any disinclination to endeavor to accommodate ourselves to anything which may seem desirable for the proper development of the Clevelanc Harbor. We want to see that development. We are just as much interested ir it as we are in any harbor on the Lakes, and by virtue of the fact that this i our headquarters we should be more interested in it, and I believe we are, but on the other hand, we can't conceive how the lights, let alone the question o wireless which the ships carry, can be carried any lower than they now ar carried with safety to navigation. The lights carried aft on our ships, and yo understand they all have their boilers and engines located aft, are often obscured by the smoke from the stack, so that unless they are carried considerabl above the stack they are not a guide to the direction in which the ship is sailing for one who is approaching or meeting that ship.

One of the greatest elements in safety of navigation in the narrow channel in connecting waterways through which all of our ships have to go, is that af light carried in conformity with the White law, and we do not believe we ca carry it any lower than we do carry it on such ships as go under the 93-foo clearance now given us by the Central Viaduct, in safety; and as the size o the ships increase the carrying of the lights still higher is necessary, that the may clear the stacks that are put in to increase the draft and thereby increas the power of the larger boats, and also to get clearance above the house which are carried higher for more commodious crew accommodations, an unless all signs fail the size of the houses will have to be increased and mad higher to carry the additional crew which the Government is evidently goin to make us provide for on these ships. For that reason and for these reason we don't see how a sufficiently safe clearance can be provided if we go belov 93 feet, and in fact in accommodating ourselves to 93 feet we sacrificed wha might have been called the very best protection, and have adopted a lowe carrying of lights which very possibly may make less safety in navigatio under smoke and fog conditions.

Col. **Newcomer**. In the river you wouldn't have to carry your lights so higl of course. Couldn't you have some adjustable apparatus for the lights?

Mr. **Collins**. If they were carried adjustable, the question would be whethe they would be strong enough to withstand the storms, and also whether th attention of the crew would be sufficiently directed to it in order to have i properly adjusted when it was necessary to enable passage under the bridges etc., so that we might be continually undergoing repairs and delays to accommodate ourselves to these conditions; and, naturally, if it becomes necessar for ships to carry wireless as the ocean ships do, we will need all the heigh we have got.

Mr. **Lechlider**. Our people have always expressed themselves as favoring th project, and they have given a great deal of study to it, and I do not know o ything that will change their views along these lines. We feel as the other izens of Cleveland feel, that it will benefit the city of Cleveland and are erefore willing to share our part of it in helping it along. That is all I have say as concerns the Baltimore & Ohio Railroad.

Col. Newcomer. Would the offer of 50 per cent on the part of the city of eveland have to be indorsed by public vote—would the question have to be bmitted to the people?

Mr. Springborn. Not necessarily. The council has authority to issue or thorize the sale of bonds without submitting it to the people, and it may be so submitted. Just what course the city would pursue, of course, I am t prepared to say. The council of the city of Cleveland, however, has ne on record as favoring the improvement and will do everything necessary raise its proportion of the fund.

Mr. Holmes, representing the Wheeling & Lake Erie, is here, and we would e to hear from him.

Mr. Holmes. I can't say very much except, as Mr. Lechlider has said, the heeling & Lake Erie is not opposed to this project, and in a general way ors it. We are not so heavily interested in the lower docks as some of the ner lines, because we do not have them; but we are in the upper valley, and have some dock property above the present project that will some time ssibly be of some value to us after the work is done.

Ir. Springborn. Mr. Clarke, representing the Big Four, is here and we would e to hear from him.

Ir. Clarke. Mr. Chairman and gentlemen. I do not understand that this plan templates interfering with the Big Four system. So far as the development the valley is concerned, we are very much interested in it, and the Big Four ilroad, as well as the New York Central lines, will be very glad indeed to perate with the city in regard to the development of the valley or any other tters that may come up where we would be benefited.

Ir. Springborn. Mr. Johnson is here; he has been connected with the Baltire & Ohio Railroad for a long time, and I think we ought not to adjourn il we hear from him.

Ir. Johnson. I can not say anything to add to what has been said here with erence to the railroads. I know that our people are in accord with all that been said or done with reference to this improvement.

ol. Newcomer. Is it expected the railroad companies will contribute anyng toward the expense of the alteration?

Ir. Springborn. They will be put to considerable expense in the matter of ring conditions, and while there is no understanding among the railroads. east on the part of the city, I can not answer that question. I know this. ever, that much better railroad terminal facilities could be provided if river were straightened, many of the river bridges could be eliminated, and railroads could arrange to have their tracks on one side of the river and s at one point instead of in the haphazard manner that they do at present. that a general rearrangement of railroad facilities is not only desirable, but sible, and all of those whom we have talked to have expressed their willings to bring about that kind of a condition.

want again to refer to the question of the height of this bridge. The county ineer, who is in charge of the construction of this bridge, has had the matter and I think Mr. Hoffman has embodied it in his talk with you to-day in paper that he read, and that is the possibility of building a basin just south his bridge and going through under the high arch and then making the . It doesn't make as straight a channel, but if that plan or modification oute No. 1 were made with that suggestion in view, the boats would have -foot vertical channel.

l. Black. We would be glad to have a map showing that alteration sent s.

r. Springborn. We would be glad to send it to you.

r. Baxter. Just as regards this matter of the height of clearance. It is a inent question. I had the privilege the other day of sitting with a number entlemen who were considering the question of certain bridges across the th of the river; engineers from the Lake Shore and engineers from my own pany were there, and it was agreed between them when certain modifications hat bridge were suggested, that it was a rash engineer nowadays who would anything was impossible. I think you gentlemen are all in accord with the ama Canal, and you have seen these other great undertakings, and I am you will all agree with that statement. This is a big problem, the height of

these masts and the height of this bridge, but I am firmly convinced the probl
can be met in some way or other, and I think we all feel the same way. I th
if route No. 1 appears to be impracticable for any reason it can be modi
or some other arrangement can be made for the straightening of that ri
There are two or three routes that have been suggested by your own engine
that are practical and feasible, and it may be possible that some developm
before this project is completed will be apparent to all of us that will cha
the idea of the vessel men as to how they can manage their masts. I do
that, but in some way maybe some arrangement can be made. I do not th
that any little difference ought to influence your judgment on the project,
cause these are just little family differences that we can all adjust, and
are all approaching it in the right spirit, and I have no doubt in the wo
if the Government sees fit to provide an appropriation for making available
approaches to our upper river valley we will find some way of settling all
these matters.

Col. Black. Anything further?

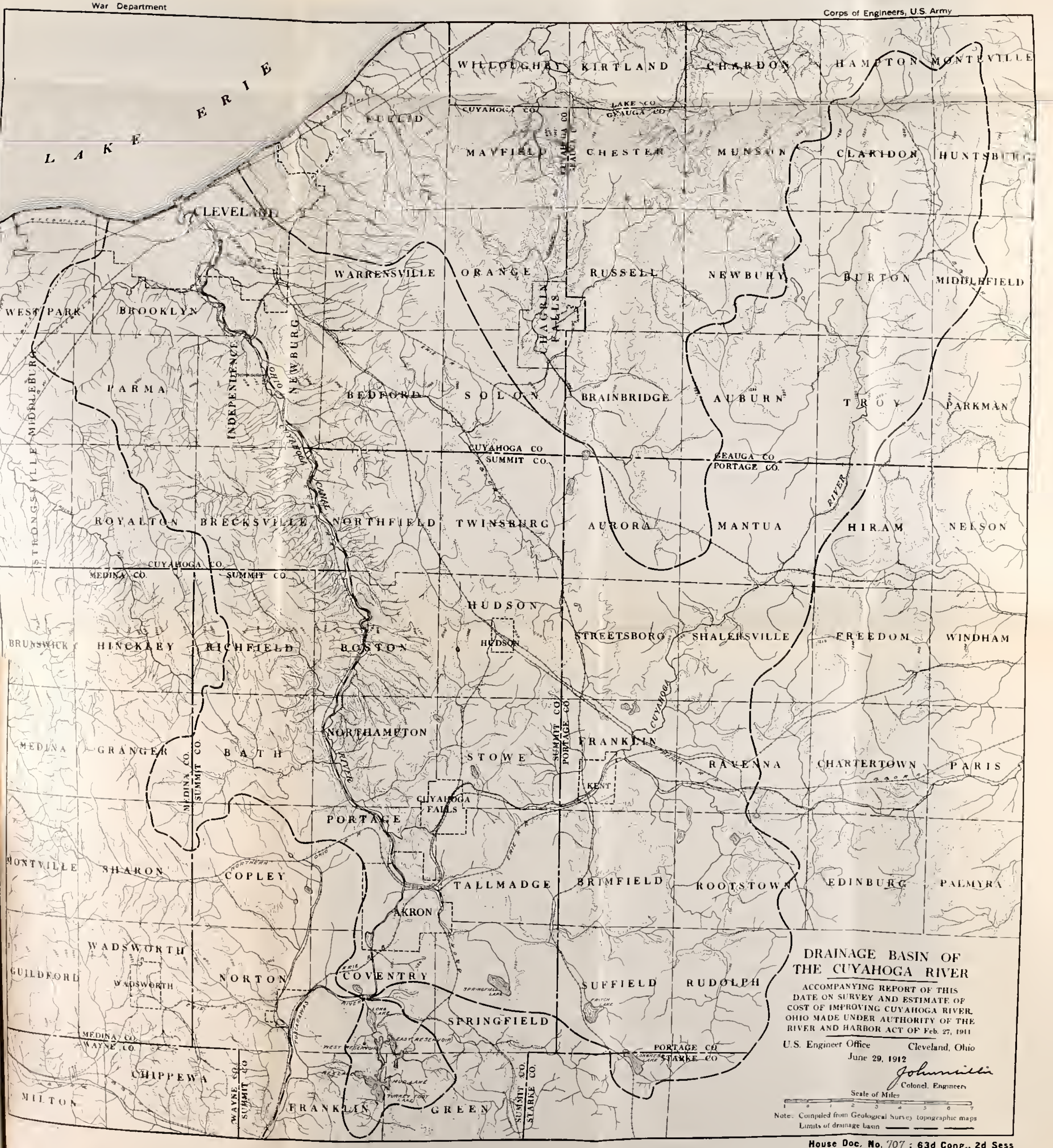
Mr. Springborn. Nothing further. Should you desire to have the city e
neer or any representative of the city come there, we will be glad to send
to answer any question that arises in your mind as regards that inner har
I want to say we have had the most cordial relations with most of your l
engineers and Mr. Brownell, and we ask of you your earnest consideratio
this matter, and we hope we have presented to you sufficient arguments a
why this improvement ought to be made and as to why the Government sho
help us.

Col. Black. The board will take this matter up in Washington and will go
with it, and should we desire further information we will take pleasure in c
ing upon you for it. We thank you very much for the information, and if
are in need of any more we will let you know.

○

War Department

Corps of Engineers, U.S. Army



DRAINAGE BASIN OF THE CUYAHOGA RIVER

ACCOMPANYING REPORT OF THIS DATE ON SURVEY AND ESTIMATE OF COST OF IMPROVING CUYAHOGA RIVER, OHIO MADE UNDER AUTHORITY OF THE RIVER AND HARBOR ACT OF Feb. 27, 1911

U.S. Engineer Office Cleveland, Ohio

June 29, 1912

John Millis

Colonel, Engineers

Scale of Miles

1 0 1 2 3 4 5 6 7

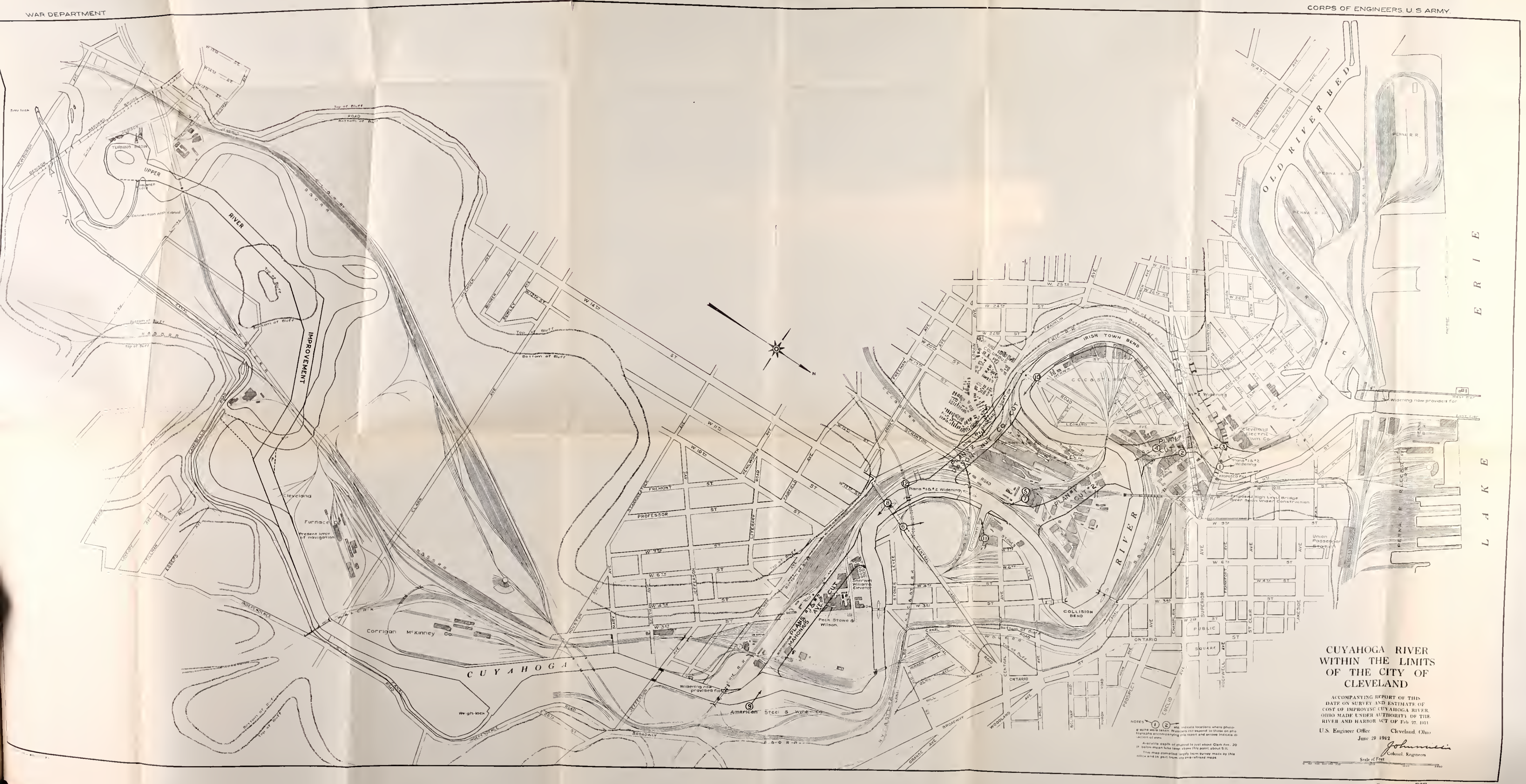
Note: Compiled from Geological Survey topographic maps

Limits of drainage basin — — —

House Doc. No. 707 ; 63d Cong., 2d Sess

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY.



CUYAHOGA RIVER WITHIN THE LIMITS OF THE CITY OF CLEVELAND

ACCOMPANYING REPORT OF THIS DATE ON SURVEY AND ESTIMATE OF COST OF IMPROVING CUYAHOGA RIVER, OHIO MADE UNDER AUTHORITY OF THE RIVER AND HARBOR ACT OF Feb 27, 1911

U.S. Engineer Office Cleveland, Ohio

June 29 1912

John Millis

Colonel, Engineers

Scale of Feet

NOTES ① ② etc. indicate locations where photographs were taken. Numbers correspond to those on photographs accompanying this report and arrows indicate direction of view.

Available depth of channel is just above Clark Ave. 20 ft. below mean lake level above this point about 5 ft.

This map compiled largely from survey made by this office and in part from city and railroad maps.